NETWORK WORLD

The Newsweekly of User Networking Strategies

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ISDN holds promise for EDI's future

By Tom Smith
New Products Editor

Integrated Services Digital Network technology holds promise for the next generation of EDI applications, according to some forward-looking users.

Once it is widely deployed, ISDN will provide companies with high-quality, high-bandwidth digital transmission facilities without the need to build private networks or use dedicated lines from carriers. The capacity provided by ISDN lines will also enable users to transmit complex documents that incorporate graphics or images.

In addition, ISDN could greatly expand the reach of electronic data interchange by making it easier to tie smaller businesses into EDI networks.

The use of ISDN technology for EDI applications is being studied by the North American ISDN Users' (NIU) Forum, which has formed a working group that is exploring how EDI users could exploit ISDN's Basic Rate Interface. The Basic Rate Interface supports two 64K bit/sec bearer channels and one 16K bit/sec signaling channel.

Claude Stone, vice-president for EDI market development at The First National Bank of Chicago and vice-chairman of the NIU Forum's ISDN Users' Workshop,

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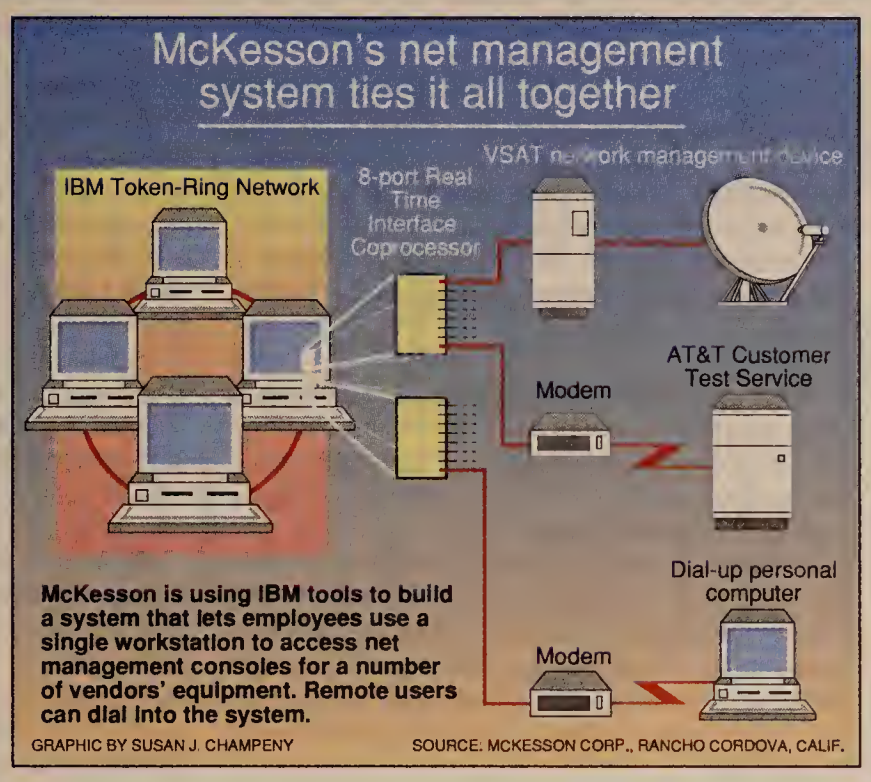

McKesson is using IBM tools to build a system that lets employees use a single workstation to access net management consoles for a number of vendors' equipment. Remote users can dial into the system.

GRAPHIC BY SUSAN J. CHAMPENY | SOURCE: MCKESSON CORP., RANCHO CORDOVA, CALIF.

User automates help desk, net control with IBM tools

McKesson builds multivendor net management system with IBM application development product.

By Paul Desmond
Senior Writer

SAN FRANCISCO — McKesson Corp. is building a net management system capable of controlling equipment from multiple vendors by using tools available in a recently announced IBM product that automates help desk functions.

The software development tools have enabled McKesson, a wholesale distributor of pharmaceuticals and dry goods, to develop its own automated help desk application and serve as a foundation for centralizing control of a range of network management systems.

McKesson, based here, originally approached IBM looking for tools that would simplify the job of developing applications to automate manual help desk tasks. IBM came up with an application development tool for microcomputers that uses its REXX fourth-generation language.

The software enables users with no programming knowledge to write applications in a language that approximates English.

McKesson used the software to

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Compaq enters LAN mart with server line

Company achieves performance breakthrough without resorting to proprietary technologies.

By Susan Breidenbach
West Coast Bureau Chief

HOUSTON — Compaq Computer Corp. last week entered the local-area network market with the introduction of a line of superservers that use a standard architecture and yet support multiple processors, mainframe-type mass storage and huge amounts of system memory.

The Extended Industry Standard Architecture (EISA)-based SystemPro products — the first computers Compaq has designed specifically for server and multiuser environments — represent a quantum leap in performance over Compaq's Deskpro 386, industry experts said. The Deskpro 386 is currently one of the most popular hardware platforms for LAN servers, although it is simply marketed as a microcomputer.

The SystemPro line is based on a 33-MHz Intel Corp. 80386 microprocessor and can accommodate a second 80386. Both the primary and secondary processors are on plug-in cards, not a motherboard, and users will be able to upgrade the system with 80486 processors as soon as the recently recalled chips are available from Intel.

The top-of-the-line model can contain up to 1.68G bytes of internal disk storage while leaving room for six network interface cards. The SystemPro can also accommodate as much as 256M

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Insurance firms dump paper for networks, page 50.

LAN Manager camp readies for offensive

By Susan Breidenbach
West Coast Bureau Chief

Microsoft Corp. and its beleaguered LAN Manager OEMs have bound their wounds and, armed with Version 2.0 of the net operating system unveiled last week, are preparing to start the new decade with a major offensive.

ANALYSIS

The early 1989 campaign that launched LAN Manager 1.X as a challenger to Novell, Inc.'s NetWare failed miserably, leaving many once-enthusiastic OEMs as casualties. There is still a lot of bickering in the ranks ("Our LAN Man is better than your LAN Man"), but the troops can take comfort in the fact that they are finally armed with some heavy artillery.

LAN Manager's detractors will be able to find fault with the new product, but they will no longer be able to call it "Son of MS-Net" with any accuracy. At a LAN Man-

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NETLINE

TARIFF 12 JUGGERNAUT rolls on as AT&T signs on two new custom net users. Page 2.

LARGE FOOD DISTRIBUTOR hands over its DP and network operations to Infonet. Page 2.

TIMEPLEX BOLSTERS its network services with three new consulting offerings. Page 4.

DEC SOFTWARE TIES IBM OS/2-based micros to DECnet networks. Page 4.

CENTREX SHINES as a viable alternative to private branch exchanges. Page 5.

IF YOUR NETWORK is taking "hits," you may have Alligators in the Swamp. Page 94.

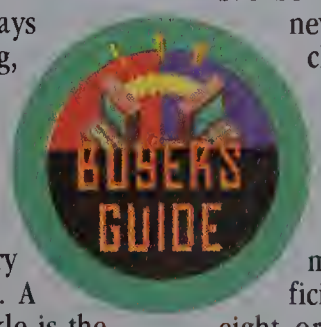
NEWSPAPER

FEATURE

New twists in Ethernet not just token advances

By John Hunter
Contributing Editor

Ethernet continues to come up with new ways to keep users buying, despite the appeal of such technologies as Fiber Distributed Data Interface (FDDI) and the current industry darling, token ring. A new Ethernet wrinkle is the emerging IEEE 10BaseT standard, which permits low-cost unshielded twisted-pair wiring to be used as a 10M bit/sec backbone. Others are the new 32-bit interface chips, such as Intel Corp.'s 82596 and NCR Corp.'s 92C28, both of which move data in and out of nodes more quickly and efficiently than the usual eight- or 16-bit chips.



One shortcoming of Ether-

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AT&T chalks up two more users for Tariff 12 deals

Custom network for Citibank's U.S. credit card operations replaces a hodgepodge of services.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T last week landed two more large corporations as Tariff 12 customers, filing custom network plans for Citibank, N.A.'s U.S. credit card operations and a second unnamed user.

The agreement with Citibank, the nation's largest issuer of Mastercard and Visa credit cards, will be worth a minimum of $36 million over three years, with AT&T projecting revenue of $43.5 million over the life of the contract.

Although Citibank's contract initially covers only its U.S. credit card operations, other company units may be added later.

AT&T will consolidate a number of voice and data services into a single Software-Defined Network-based offering that includes centralized network management, 900 services and private lines.

Previously, the company used a wide variety of AT&T services, including 800, Megacom, Megacom 800, Readyline 800, 56K

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Food co. chooses Infonet to run DP, net operations

Firm hopes to cut costs, focus on core business.

By Wayne Eckerson
Staff Writer

HANOVER, Md. — In a move to cut costs and focus on its core business, one of the nation's largest food distributors last week handed over operation of its data processing and network operations to Infonet, an international value-added network firm.

Under the five-year, multimillion-dollar contract, Infonet will handle data processing and technical support, maintain system software, and build and manage a network for JP Foodservice, Inc., based here.

JP Foodservice joins a number of major users that have recently farmed out management of their network operations to vendors. Industry analysts say these deals show users are beginning to question whether it's necessary to run private networks in order to gain a strategic advantage from them.

JP Foodservice was spun off this summer from PYA/Monarch, Inc., a mid-Atlantic food service distributor, in a billion-dollar leveraged buyout. JP Foodservice will continue to develop applications and provide help desk support for its nine distribution centers located throughout the eastern U.S.

"We aren't in a business where we should have to worry about maintaining computer hardware and communications nets," said George Davis, director of corporate data processing for JP Foodservice. "We want to leverage computer applications to benefit our core operations."

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Study says power of EDI untapped by many users

By Wayne Eckerson
Staff Writer

OAK PARK, Ill. — Despite the promise that electronic data interchange will improve business efficiency, most U.S. corporations have yet to implement the technology, according to a study released last week.

The study, conducted by the Gallup Organization for EDI Research, Inc., an EDI market research firm based here, showed that less than one quarter of all companies surveyed will have implemented EDI by the end of 1989 and only an additional 6% are planning to implement EDI in 1990.

Despite EDI's limited acceptance to date, EDI usage is growing at a steady rate, driven mainly by a few large companies that are pushing trading partners to adopt the technology, according to the survey titled "The State of U.S. EDI: 1989."

The study is based on interviews with 1,500 managers from large companies representing a wide range of industries.

In addition, the study evaluated the use of value-added networks for EDI transmissions, translation software, electronic funds transfer and EDI standards, and it assessed the benefits and drawbacks of implementing EDI.

"EDI is not experiencing the rapid growth many people predicted one or two years ago," said

(continued on page 84)

Briefs

New look for Wang. Wang Laboratories, Inc. of Lowell, Mass., last week said it will cut 2,000 jobs, or 8% of its work force, by Jan. 1, 1990, as part of a corporate restructuring. The layoffs will take place across the board, including at the company's Allen, Texas-based InteCom, Inc. subsidiary, which sells private branch exchanges. Task forces are being formed that will determine exactly where cuts will be made.

Recently named president and chief operating officer, Richard Miller, called for "a radical and fundamental reordering" of the way the company conducts business. Wang will work to cut bureaucracy in order to get products to market faster and serve customers better, he said. The company anticipates a $30 million charge against earnings in the current quarter.

FCC clarifies AT&T rulings. The Federal Communications Commission last week issued the full text of two rulings it made late last month when it refused to prohibit AT&T from offering network deals under Tariffs 12 and 15.

On Tariff 12, the FCC let stand its earlier decision that integrated voice and data packages are lawful as long as all users have access to comparable deals. However, the text explicitly said the packages must also be made available to resellers and systems integrators, an aspect of the ruling that opponents said was unclear.

The Tariff 15 text provided little new information on how the FCC will handle new filings. Although the agency rejected AT&T's first network plan filed for Holiday Corp., it refused to rule on whether to label single-customer pricing as an illegal practice.

MCI Communications Corp., US Sprint Communications Co. and others last week filed protests against AT&T's second Tariff 15 offering, which AT&T filed last month for Resorts Condominium International, Inc. in Indianapolis.

Fighting back. In an effort to combat lost profit from the increased usage of facsimile machines, the U.S. Postal Service last week said it plans to test credit card-operated, self-service facsimile machines in its post offices. If the test proves positive, the Postal Service envisions installing some 8,000 fax machines across the country and reaping $96 million in revenue from the the service.

Hotelecopy, Inc., a Miami-based company that offers FaxMail services at some 2,000 hotels, was selected to put 55 fax machines in 54 post offices in the Northeast. MCI Communications Corp. will provide the long-distance service.

Thanks, but no thanks. An Illinois Bell Telephone Co. official last week commended the Illinois Commerce Commission for adopting a modified regulatory structure but said rate reductions that were ordered under the new structure are "excessive and totally inappropriate." The Illinois Commerce Commission ordered Illinois Bell to cut rates by $45.8 million as of Jan. 1. Last July, the commission ordered the phone company to cut rates by $85 million.

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DEC unveils DECnet link to OS/2 PCs, enhances net tools for DOS

By Jim Brown
Senior Editor

BOSTON — Digital Equipment Corp. last week announced software to link IBM OS/2-based microcomputers to DECnet networks and rolled out enhanced versions of existing packages that perform a similar function for DOS-based machines.

DECnet for OS/2 software enables IBM Personal System/2 microcomputers running OS/2 to act as end nodes in Phase IV DECnet networks. End nodes can interact as peers with other DECnet devices but cannot route DECnet traffic.

The enhanced DOS software includes new versions of both the VAX-based VMS Services for PCs and DECnet Personal Computing Systems Architecture (PCSA) Client software for DOS microcomputers.

DECnet for OS/2 will run on IBM Personal System/2s and compatibles with at least 1.5M bytes of random-access memory and enable users to store Personal System/2 files on a VAX, exchange electronic mail with DECnet devices and emulate a DEC VT-220 terminal in order to access VAX-based applications.

It also supports task-to-task communications, which allows application developers to build OS/2 applications capable of communicating across DECnet with applications on other DECnet devices.

DECnet for OS/2 costs $300, is expected to ship next month and will work with Ethernet interfaces that support either IBM's Micro Channel bus or the Extended Industry Standard Architecture bus, said Gail Daniels, DEC's director of local-area network marketing. OS/2-based microcomputer users will have to use DECnet commands to access DECnet resources.

Bringing OS/2 into the enterprise

"The goal with this initial OS/2 product is to bring these OS/2 desktops into the DECnet enterprise network environment," Daniels said.

OS/2-based microcomputers will not be fully integrated into DECnet until next spring when DEC releases enhanced versions of VMS Services for PCs and DECnet PCSA Client specifically tailored for OS/2.

The OS/2-based client software will enable users to invoke OS/2 commands to access DECnet resources. Customers that buy DECnet for OS/2 will get a free upgrade to the OS/2-based client software.

Both future versions of VMS Services for PCs and PCSA for OS/2 software will support the Named Pipes application programming interface in Microsoft Corp.'s LAN Manager.

This will enable OS/2-based microcomputers to use DECnet to access LAN Manager applications running on a VAX server. Existing VMS Services for PCs and PCSA for DOS already enable DOS-based microcomputers to use DECnet to access VAX-based applications that support IBM's Network Basic I/O System.

DOS enhancements

Version 3.0 of VMS Services for PCs, which enables a VAX to act as a network server for DOS-based microcomputers, features performance improvements that enable it to operate 2½ times faster than previous versions. The software still costs $750 and will be available next month.

Version 3.0 of PCSA for DOS features enhancements that preserve RAM on DOS-based microcomputers outfitted with expanded memory services software and extended memory services hardware. With Version 3.0, portions of the DECnet PCSA Client for DOS software run in expanded memory, thus freeing up 512K bytes of RAM. Scheduled to ship next month, DECnet PCSA Client for DOS Version 3.0 costs $250.

The announcements complement DEC's strategy of connecting disparate desktop devices to DECnet and is part of DEC's broader strategy of rolling out products that adhere to its Network Application Support (NAS) application development blueprint, analysts said.

NAS allows developers to build applications that allow disparate systems to share data through DECnet. The first NAS-based products, Phase II of DEC's All-in-1, were announced last month ("DEC's new All-in-1 pack enables micros, workstations to swap data," *NW,* Oct. 16).

Analysts said DEC's strategy to support disparate desktop devices under DECnet positions the company to compete against vendors such as Novell, Inc. and 3Com Corp., which have been persuading potential DEC customers to install LANs of microcomputers instead of VAX minicomputers. It also positions DECnet as an alternative to LAN Manager.

"There have been sales that could have been VAXes that went to PC LANs," said Lee Doyle, manager of LAN research at International Data Corp., a market research firm in Framingham, Mass. "They needed to do this to remain competitive."

Correction: Due to incorrect information supplied by Bull HN Information Systems, Inc., the story "Groupe Bull to purchase Zenith group" (*NW,* Oct. 9) wrongly reported that Groupe Bull agreed to acquire Zenith Electronics Corp.'s Z-LAN product line. Z-LAN products are offered by the Zenith Communications Products group, which was not involved in the sale.

Timeplex widens net consulting service options

By Paul Desmond
Senior Writer

WOODCLIFF LAKE, N.J. — Timeplex, Inc. last week bolstered its customer service offerings with the introduction of consulting services designed to help users manage and optimize their networks and find qualified staff members.

The T-1 equipment vendor announced the Timeplex Professional Services (TPS) family, which includes three new and two existing service offerings. The new services — Network Management, Network Optimization and Net-Search — join the ComWatch and Network Staging services to round out Timeplex's service offerings.

Through the Network Management and Network Optimization consulting services, Timeplex personnel or third parties hired by Timeplex will help users resolve network problems or implement strategies for such tasks as network consolidation, growth planning and performance measurement.

Net-Search is a placement service through which Timeplex helps users find and train network staffers. ComWatch is an off-site network monitoring service, and Network Staging lets users test equip-

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Centrex users group enthusiasm bolsters belief in once ailing service

Users return to less expensive and more reliable Centrex.

By Bob Wallace
Senior Editor

ATLANTA — The resurgence of Centrex as a viable alternative to private branch exchanges was in evidence at the third annual National Centrex Users Group conference here last week.

Requiring less support and generally considered more reliable and less expensive than PBXs, switch makers and service providers are marketing the technology more fervently than ever before.

Chrysler Corp.'s upgrade to over 14,000 lines of digital Centrex from Michigan Bell Telephone Co. and a recent rash of converts from PBXs attest to the popularity of a service once given up for dead after the divestiture of AT&T.

"We didn't really [make] a commitment to software upgrades to our central office switches until 1986," said Doug Springfield, group product manager for BellSouth Services, Inc.

Market research from The Eastern Management Group, a Parsippany, N.J.-based company, suggests that 1987 was a turnaround year for Centrex. The installed base of Centrex lines rose 3.4% in 1987, 9.9% in 1988 and is expected to increase 4.8% this year.

Eric Schmedieke, a research director with The Eastern Management Group, credits aggressive pricing, continual service enhancements and flexible contract terms.

"Old Centrex users have considered PBXs but upgraded to digital Centrex instead. The service has made noticeable inroads against midsize and small switching systems," Schmedieke said.

In the case of Chrysler, the automaker upgraded from an analog Centrex supported by an AT&T 1AESS switch to a digital Centrex supported by a Michigan Bell Northern Telecom, Inc. switch.

Like Michigan Bell, BellSouth Services is using a mix of service enhancements, flexible deals and innovative rates to keep current customers and win new business. The carrier last year began offering rate-stabilized contracts that lock in pricing for one-, three- or five-year periods.

"But that was not nearly enough," Springfield said. "Many of our current and prospective customers said they wanted us to be flexible within those periods."

The company responded by offering rate-stabilized contracts starting at one-year increments and increasing in one-month increments to a maximum of 83 months.

The company also offers a number of payment alternatives. "We will accom-

(continued on page 8)

Northern Tel, AT&T announce Centrex products

By Bob Wallace
Senior Editor

ATLANTA — At the third annual National Centrex Users Group meeting here last week, the top central office switch manufacturers rolled out new or upgraded products designed to enhance users' Centrex networks.

AT&T Network Systems Group unveiled a Centrex telemanagement system that enables users to issue work orders, track equipment and cable inventory, and maintain information on employee-used telephone features from an on-site workstation.

Northern Telecom, Inc. introduced new central office switch software supporting Custom Local Area Signaling Services (CLASS). The software enables Centrex users to use advanced calling features, such as selective call forwarding, across a network of CLASS-compliant central office switches.

Northern Telecom also announced Meridian Network Centrex (MNC), an offering that uses Common Channel Signaling System 7 (CCS7) links to interconnect multiple DMS-100s.

With MNC, Centrex features currently supported by a single DMS-100, including call forwarding, call transfer and automatic call distribution, can be offered across multiple DMS-100s. Northern Telecom said Chrysler Corp. will be the first MNC user.

AT&T's new Telecommunications Resource Management System is the vendor's first Centrex telemanagement system designed for use with the 5ESS central office switch.

The Telecommunications Resource Management System is a Unix-based program that runs on an AT&T 6386 WorkGroup System at the customer site and can be used to control a Centrex with as many as 20,000 lines. The workstation is linked to an AT&T 3B2 minicomputer in a telephone company central office. An AT&T 5ESS off-loads Centrex system configuration and station message detail recording information to a minicomputer, which then downloads information to the workstation running the Telecommunications Resource Management System.

The system consist of six software mod-

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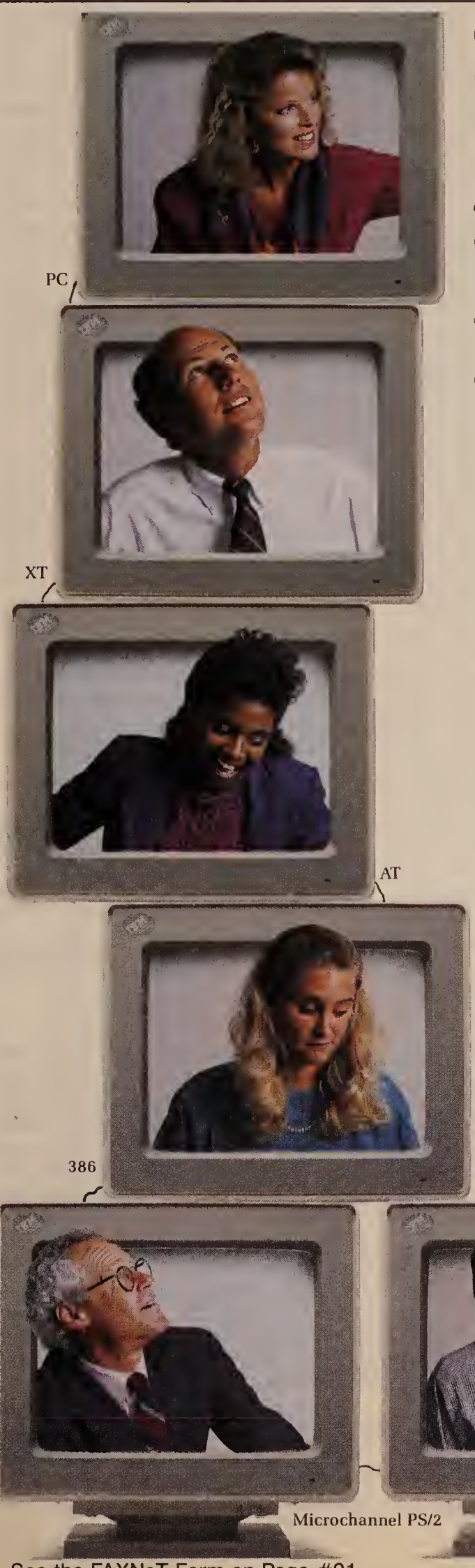

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Diaz Dennis: FCC faces some tough decisions

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Former FCC Commissioner Patricia Diaz Dennis last week told a group of network managers that the agency has a plateful of "regulatory hot potatoes" to deal with in the months ahead.

Speaking at a meeting of Capitol Women and Men in Telecommunications here, Diaz Dennis said the Federal Communications Commission must make tough choices regarding custom tariffs, price caps for the local exchange carriers and changes to the Modified Final Judgment business restrictions.

Diaz Dennis, who left the FCC a month ago and is now a partner at the law firm of Jones, Day, Reavis & Pogue, said the FCC has been hesitant to tackle difficult issues. She claimed the FCC sidestepped its responsibilities late last month when it ruled that AT&T's Tariff 15 offer for Holiday Corp. was illegal without addressing the question of whether carriers should be allowed to offer customer-specific plans.

She also expressed disappointment that the FCC let stand its earlier decision allowing AT&T to offer custom network packages at discounted prices under Tariff 12. "Ultimately, I believe the courts will have the final word on these tariffs," she said.

Some say the FCC could have avoided dealing with these sticky tariff issues if it had moved to resolve questions about AT&T's status in the marketplace.

"I urged the commission to take a comprehensive look at competition in the interexchange market to determine if the public would benefit from changes in the regulation of carriers," Diaz Dennis said. "One way or the other, the commission will have to deal with the tough question of how to best regulate AT&T in a market that is increasingly competitive."

Diaz Dennis said she was pleased that FCC Chairman Alfred Sikes plans to conduct such a review, although he has not said when he will do so. "Sikes may prefer to see how price cap regulation works for AT&T and its customers, and assess whether further regulatory changes are desirable," Diaz Dennis said. She added that Sikes is generally supportive of price cap regulation for the local exchange carriers.

But even if the current plan were to sail through the FCC, Diaz Dennis said it would face problems in Congress, where many members still oppose incentive regulation for the local exchange carriers. Consumer groups have also voiced concerns about the plan, such as the fears that caps will be set too high and that the local exchange carriers will not be prevented from cross-subsidizing competitive ventures with income from monopoly services.

"I share some of [those] concerns," Diaz Dennis said. However, she added that she is confident these issues can be resolved. "I hope the commission moves quickly toward this goal because [price caps] are a better method of regulation."

As for efforts to lift the line of business restrictions placed on the regional Bell holding companies by the Modified Final Judgment, Diaz Dennis said, "I may live to eat these words, but I'm very skeptical that legislation lifting the line of business restrictions will ever be passed."

She said armies of lobbyists have tried and failed to get Congress to pass major telecommunications legislation. "The line-of-business restrictions are sufficiently controversial that it will be difficult for the [RBHCs] to build the necessary consensus for legislative relief," Diaz Dennis said.

The big issue for the U.S. telecommunications industry, she said, is the internationalization of telecommunications and intensified global competition.

Diaz Dennis suggested that the U.S. may have to change its role, focusing "not so much on regulating, as on facilitating the ability of our companies to compete internationally." Exactly how the government should do that is "what we've got to wrestle with," she said.

AT&T bolsters SNA connectivity for computer, network systems

By Jim Brown
Senior Editor

MORRISTOWN, N.J. — AT&T last week introduced gateway software that links DOS-based microcomputers in an AT&T StarGroup local-area network to IBM mainframes.

The company also announced enhancements for its Host Connectivity Software that enable terminals attached to Unix-based 3B2 minicomputers or 6386 WorkGroup System (WGS) microcomputers to access IBM mainframes.

The StarGroup Software SNA Gateway for LANs, due to ship next month, has server and workstation software components.

The server software is Release 2.0 of AT&T's SNA/Link software, also announced last week. SNA/Link runs on AT&T's Unix-based 6386 WGS configured as a server. It makes the 6386 WGS appear to an IBM host as a PU 2.1-type IBM 3274 cluster controller supporting up to 128 concurrent sessions. Previous versions of SNA/Link supported only 32 concurrent sessions and did not have PU 2.1 capabilities.

The new software also supports higher speed Synchronous Data Link Control host links — 56K bit/sec vs. 19.2K bit/sec — than earlier releases. Additionally, users can attach the 6386 WGS server to a 4M or 16M bit/sec IBM Token-Ring Network for the first time.

The workstation component is a customized version of Digital Communications Associates, Inc.'s IrmaLAN Workstation software, which AT&T licensed from DCA.

The software runs on DOS-based microcomputers in a StarGroup LAN and supports up to five concurrent IBM 3278 or 3279 terminal sessions. It also makes microcomputer-attached ASCII printers appear to remote hosts as if they are IBM 3287 printers.

The StarGroup Software SNA Gateway ranges in price from $1,595 for a package that includes SNA/Link server software and eight clients, to $7,795 for a package consisting of server software and 128 clients. The SDLC board costs $1,595.

The Unix side

SNA/Link is also the core module of AT&T's new Host Connectivity Software. SNA/Link Release 2.0 is compatible with Unix-based 3B2 minicomputers and 6386 WGS microcomputers.

Working in conjunction with an optional 3B2- or 6386 WGS-based Host Connectivity Software package called SNA/3270, SNA/Link enables terminals attached to a 3B2 or 6386 WGS to appear to an IBM host as if they are 3278 or 3279 terminals.

Users can also order software options, such as SNA/LU 6.2, that enable both the gateway product and the stand-alone SNA/Link software to support program-to-program communications between 3B2- or 6386 WGS-attached terminals or 6386 WGS-attached microcomputers and an IBM host application.

Additionally, PU 2.1 support coupled with SNA/LU 6.2 enables users to define a group of 3B2s or 6386 WGSs as a Systems Network Architecture subarea network by taking advantage of capabilities in Version 3.2 of VTAM. This will enable end users attached to either system to exchange electronic mail or files with a user on another system over an SNA network without the intervention of an IBM host.

"The Unix machines will be able to communicate with one another as well as the mainframe through SNA," said Guy Squicciarini, AT&T group product manager for host connectivity. "In the past, Unix machines pretty much required asynchronous or X.25 networks to communicate."

SNA/Link license fees for either a 3B2 or 6386 WGS range in price from $200 for a 10-user version to $5,000 for a 128-user version.

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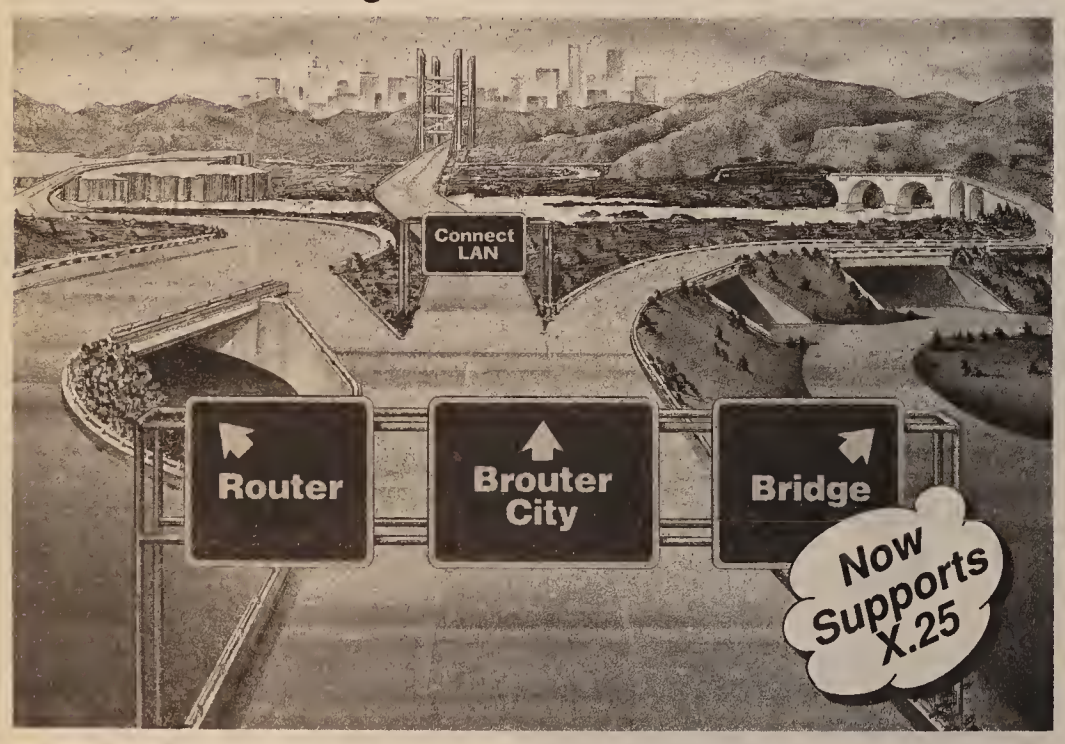

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See the FAXNeT Form on Page #91

New IBM software lets users blend asynch ASCII traffic with SDLC

Future version will integrate disparate data on X.25 links.

By Tom Smith
New Products Editor

WHITE PLAINS, N.Y. — IBM last week introduced software that enables users to integrate asynchronous ASCII traffic into asynchronous Systems Network Architecture backbone nets and said a follow-up release of the package will enable customers to combine SNA, X.25 and ASCII data on X.25 links.

The software, Programmable Network Access (PNA) Version 1.0, runs on an IBM Personal System/2 and converts asynchronous ASCII data into a synchronous EBCDIC data stream for transmission over a single line. The software will be available in June 1990.

PNA Version 1.1, the availability of which will be announced in April 1990, comes bundled with a packet assembler/disassembler for transporting SNA, native X.25 and ASCII data over a single X.25 connection.

IBM will also offer both products in C-based programmable tool kits so users can develop versions that support other protocols, such as Binary Synchronous Communications, according to Christian Berges, planning manager for PNA.

The tool kit will enable users to "address a wide variety of devices out there," said Jack Baney, manager of enterprise telecommunications marketing for IBM.

PNA Version 1.0 will allow users of asynchronous ASCII devices to emulate IBM 3278 terminals and access SNA applications such as CICS and IMS. ASCII devices supported include: IBM 3101, 3151, 3161, 3162, 3163 and 3164 terminals; IBM Personal Computers running the Host File Transfer and Terminal Emulation Program; Digital Equipment Corp. VT-100 terminals; and Minitel 1B terminals.

The code and protocol conversion takes place at a Real Time Interface Coprocessor Multiport/2 in the Personal System/2, an eight-port board that connects ASCII de-

(continued on page 8)

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Centrex enthusiasm bolsters service

continued from page 5

modate any payment plan they can come up with. [Customers] can pay everything up front, defer payment, spread it out over the life of the contract" or wait until the end of the contract to begin payments, Springfield said.

BellSouth has also recently rolled out several major new Centrex features, including voice mail, automatic call distribution, central office-based local-area networks and station message detail recording.

The same formula has helped Pacific Bell sell almost 500 Centrex systems in 1988, twice as many as the year before. In 1987, the BOC won 7% of all bids it submitted. Last year, Pacific Bell increased its wins to 33%, including netting 36 of 37 bids that it made in to large businesses.

PBX users such as First Fidelity Bancorp. are defecting to digital Centrex in increasing numbers. The Newark, N.J.-based bank recently replaced 21 PBXs with 9,000 lines of digital Centrex supporting 300 bank branches statewide.

"More and more large companies that had long favored PBXs are now taking a hard look at Centrex," according to Ian Craig, Integrated Network Systems marketing vice-president for Northern Telecom, Inc. "They want to concentrate on the main line of business. They don't want to be in the phone business anymore."

Longtime Centrex users, including Lockheed Missiles & Space Company, Inc. and the University of Texas Medical Center in Houston, are sticking with the service despite their concerns about problems with customer support, bugs in the central office switch software and slow deployment of sorely needed features.

Lockheed's Metro Centrex Network includes 22,040 lines of Centrex serving 162 buildings. The network supports a uniform, five-digit corporate dialing plan, call transfer, call forwarding and conference calling.

The Centrex network carries an average of 26,500 minutes of traffic at 4.2 cents per traffic minute, according to meeting attendee Harry Brown, staff telecommunications advisor for Lockheed Missiles & Space.

The company ran into several problems when the Centrex net was cut over. "We had to fight with an inexperienced Pacific Bell account team. Speed-calling didn't work at half the sites, and we couldn't get the system to work with our [Electronic Tandem Network]," Brown recalled.

The 5E4.2 software cannot do busy studies, Katzman said.

▲▲▲

Lockheed Missiles & Space is talking to Pacific Bell about replacing the 1AESS switch that serves its Sunnyvale, Calif., headquarters with a 5ESS switch. They are also considering replacing the four 1AESS switches and one 5ESS that are currently used to support remote sites with five remote switch modules.

The University of Texas Medical Center, which has 25 buildings in the metropolitan Houston area, began using analog Centrex from a single 1AESS switch in 1981.

The center upgraded to 8,000 lines of digital Centrex when Southwestern Bell Corp. replaced the older switch with an AT&T 5ESS. The newer system, which uses the 5E4.2 switch software release, supports a uniform, five-digit dialing plan and can accommodate future growth, according to Marilyn Katzman, director of telecommunications services for the medical center.

"When we got ready to do the switchover, [Southwestern Bell] told us it would be totally transparent, which wasn't quite the case," Katzman said. The 5ESS software does not allow attendants to activate and deactivate the switch's call-forwarding feature, which is "a major source of frustration," she said.

According to Katzman, the 5E4.2 software cannot do busy studies, which list the number of incoming calls that receive busy signals per station. "Since we don't know how many calls are [getting busy signals], we don't know if we need more or fewer lines," she said.

Software lets users blend asynch, SDLC

continued from page 6

vices and SNA devices, which can include the IBM 3174, 4680 and Series/1 minicomputer.

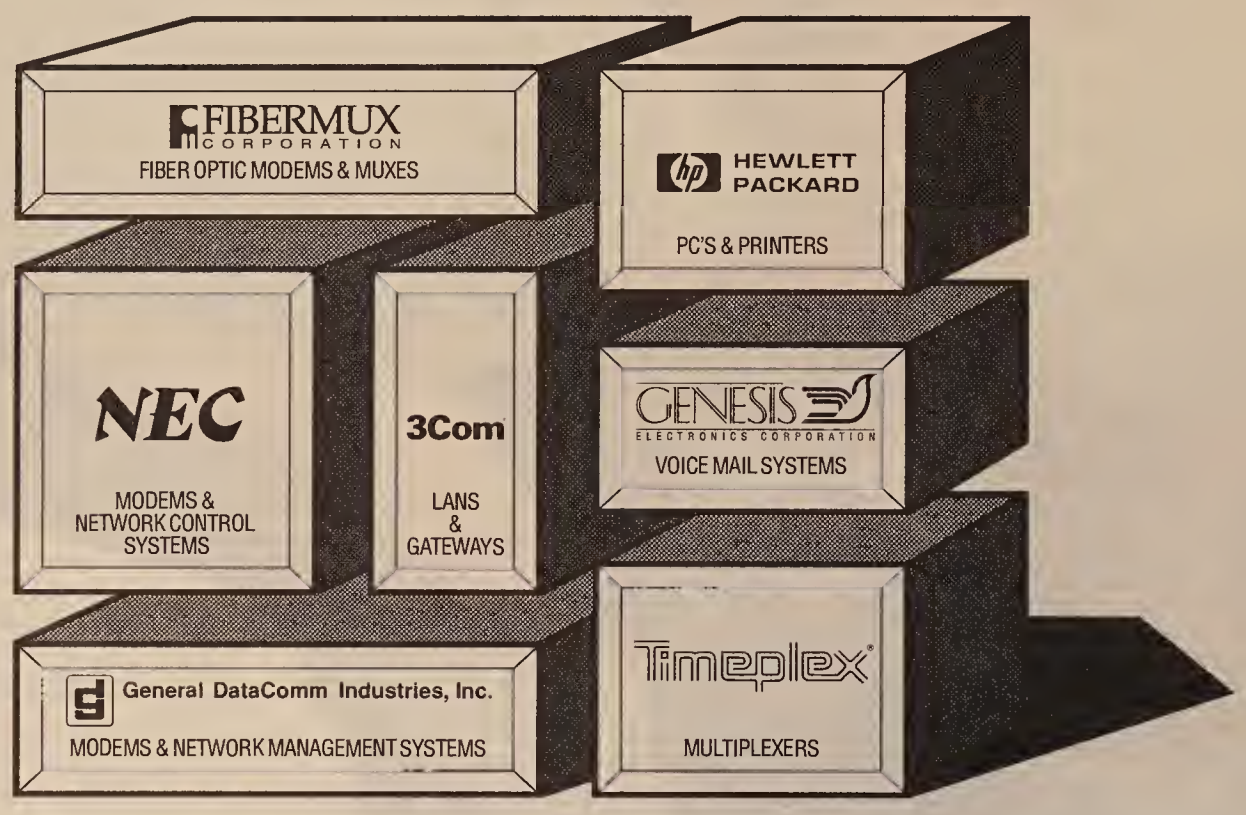
The Personal System/2 can have four of these Multiport/2 cards, aggregating the traffic of up to 32 downstream devices over a single Synchronous Data Link Control line.

In addition, Version 1.0 supports IBM's X.25 Qualified Logical Link Control (QLLC), a packetizing format processed by an IBM X.25 Interface Co-Processor/2 board that also resides in the Personal System/2. To run X.25 QLLC, customers must have OS/2 Extended Edition Version 1.2.

Version 1.1 will have all the capabilities of Version 1.0 but will have a bundled PAD, which will allow the package to support not only asynchronous ASCII and SNA devices, but native X.25 terminals as well.

Another key feature of Version 1.1 is an application program interface that will allow users to develop applications that let an ASCII terminal user access local non-PNA applications that are also running under OS/2 in the Personal System/2.

Version 1.0 and Version 1.1 will each cost $2,000. Tool kits for both versions will be priced at $1,500.



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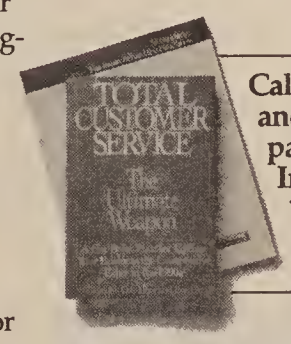

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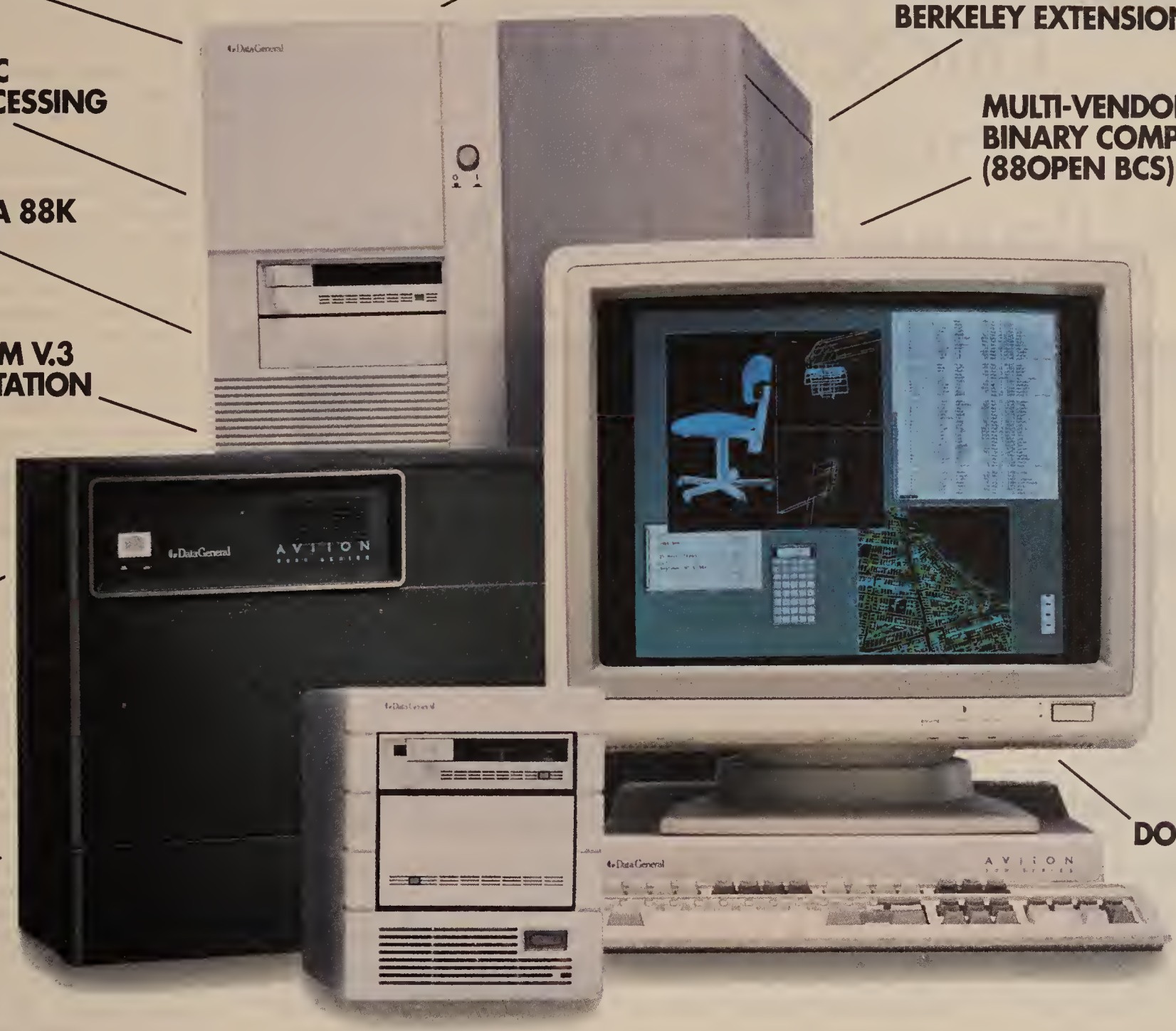

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Compaq enters LAN arena with servers

continued from page 1

bytes of system memory chips.

Analysts said Compaq's decision to base the SystemPro on EISA distinguishes the device from superservers such as NetFrame Systems, Inc.'s recently introduced NetFrame. NetFrame offers mainframe-type I/O but uses a largely proprietary hardware architecture and requires special versions of NetWare and LAN Manager.

By contrast, the SystemPro can accommodate EISA and industry-standard add-in boards, and can run standard system software. Developed by a group of IBM competitors, EISA is a superset of the Industry Standard Architecture (ISA) used in IBM's original Personal Computer line. The EISA bus provides much higher I/O throughput while maintaining downward compatibility with ISA hardware.

"I think the SystemPro is more significant than NetFrame," said Bruce Lupatkin, senior technology analyst for investment banker Hambrecht & Quist, Inc. "It's a natural evolution of where PC architecture will go. It will be delivered and supported by traditional reseller channels, and it can be used as a high-powered general-purpose personal computer."

Other EISA machines have already been introduced by Advanced Logic Research, Inc., Ing. C. Olivetti & Co., S.p.A. and Hewlett-Packard Co., but they have not been positioned as servers.

Compaq has licensed Microsoft Corp.'s new version of LAN Manager, Version 2.0 (see "LAN Manager camp readies for offensive," page 1) as a system software option for the SystemPro, but it will also run Novell, Inc.'s NetWare and The Santa Cruz Operation, Inc.'s (SCO) Unix/386. The LAN Manager license represents the first time Compaq has offered a network operating system with any of its computers.

"We looked at the market and saw three operating systems that needed to be exploited by a machine like the SystemPro: NetWare, Unix and OS/2," said Gary Stimac, senior vice-president of system engineering at Compaq. While Novell and SCO were eager to take care of the first two, respectively, Compaq decided to do the LAN Manager development itself instead of turning to an established LAN Manager OEM such as 3Com Corp.

"We decided that we needed to work with the company that controlled the core LAN Manager technology — and that's Microsoft," Stimac said.

"We aren't taking sides" in the network operating system war between Microsoft and Novell, Stimac said. "We're just leveraging the industry leaders."

The SystemPro is being positioned as a "minicomputer killer." To bolster this claim, Compaq released results of benchmark tests it commissioned from Neal Nelson & Associates, an independent testing firm in Chicago.

In a 60-user Unix environment, the tests showed the SystemPro to be more than six times faster than a Digital Equipment Corp. VAX 6310 and more than three times faster than an HP 9000 Model 835. "The SystemPro sells for about $135,000 less than the VAX and about $68,000 less than the HP 9000," said Rod Canion, Compaq's chief executive officer.

Compaq attributes part of the SystemPro's performance to its dual-bus architecture, which includes a 33-MHz EISA bus and a proprietary processor/memory bus.

The EISA bus moves data between the server's memory and disk storage or the network at the same time that the proprietary processor/memory bus is handling central processor operations. The SystemPro has 11 32-bit expansion slots — seven on the EISA bus and four on the system bus. One of the EISA slots is taken up by Compaq's Intel 80186-based disk drive array controller, leaving as many as six slots open for network interfaces. A number of third parties have already introduced such products (see "EISA-based network adapters on the way," page 31).

The SystemPro's 80386 central processor and at least 4M bytes of system memory are on a board that occupies one of the four system bus slots. Another slot on this bus is reserved for the optional second processor board, and the remaining two are strictly for memory expansion.

The drive array controller can handle up to four 420M-byte pairs of hard disks, for a total of 1.68G bytes of internal mass storage. Data is arrayed across the multiple synchronized disk drives, which are viewed by the server as a single logical disk. There are parallel data paths into each of the arrayed drives, so that if a user requests information on one drive while another user asks for data on a second drive, the disk controller can deliver both pieces of information simultaneously.

With disk arrays, part of each disk or all of some disks can be dedicated to redundancy, offering users three levels of fault tolerance. The lowest level is "data guarding," in which 25% of the space on each disk is is devoted to redundant data.

The next level up is disk mirroring, where the hard disks are split into two arrays, each with an identical set of data. The highest level of fault tolerance is disk duplexing, in which each of the identical disk arrays has its own disk controller.

Other features of the SystemPro include a diskette drive, room for a tape, a CDROM drive, a parallel port and a mouse port. Compaq plans to begin delivering the servers to its dealers next month.

Pricing for base configurations ranges from $15,999 for a Model 386-240 with a 240M-byte disk array to $25,999 for a Model 386-840 with an 840M-byte disk array. The price includes one 33-MHz 80386 system board with 4M bytes of RAM, the cache controller and cache memory.

Empty memory expansion boards cost $799, and the memory to populate them can be purchased in 2M-, 8M- and 32M-byte modules, priced at $1,299, $4,599 and $21,999, respectively.

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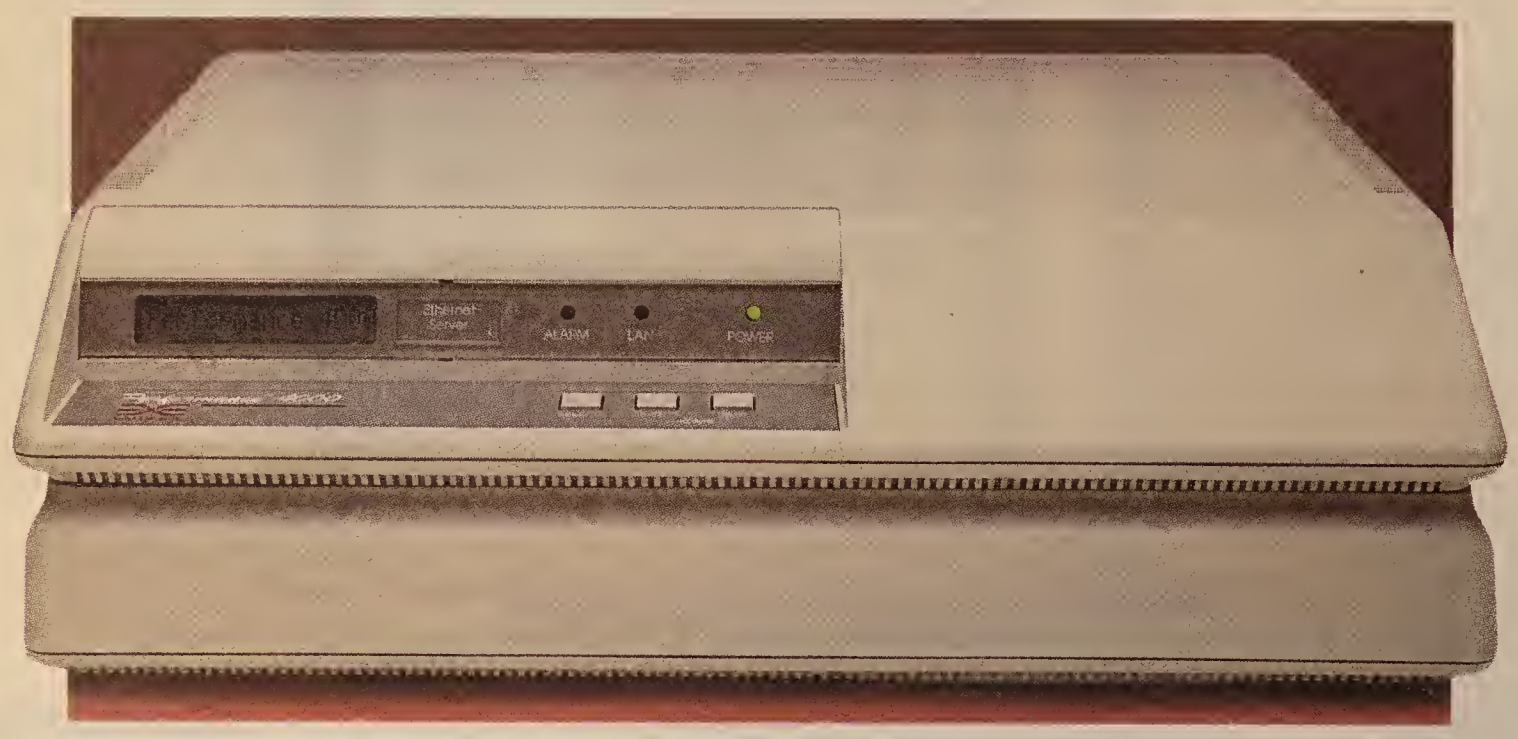

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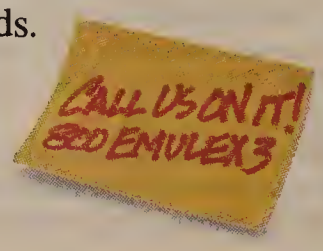

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Worth Noting

Ninety percent of the attendees at Digital Equipment Corp.'s DEC Users Society meeting in Anaheim, Calif., last week said they work in multivendor computer environments. In a survey, DEC found that 66% of the 7,000 attendees said industry standards are more important than vendor-specific standards.

People & Positions

Gary Ames was recently named to the newly created positions of president and chief executive officer of **US West Communications, Inc.** in Englewood, Colo., effective Jan. 1, 1990.

During the past two years, US West Communications, a holding company for US West, Inc.'s Bell operating companies, was run by a president of operations and a president of markets.

Now the company has united the presidents' duties under a single executive. Ames will direct all marketing, network, public policy and customer service activities for US West Communications. He will report to **Dick McCormick,** president of US West.

Previously, Ames was president of operations at US West Communications; **Tom Madison,** president of markets, remains in that post.

Hughes LAN Systems in Mountain View, Calif., recently named **Phil Edholm** vice-president of North American field operations.

Edholm will be responsible for directing all sales operations in North America for the firm. Previously, he was director of marketing. Edholm will report to **John Stringer,** vice-president of worldwide field operations. **Bill Hipp,** previously director of international operations, assumes the post of vice-president of marketing.

IEEE warns of false ads about 10BaseT compliance

Says 10BaseT not yet an approved standard.

By Bob Brown
Senior Editor

PISCATAWAY, N.J. — The IEEE recently labeled as "potentially misleading" some vendors' advertisements that claim their products comply with the emerging IEEE 10BaseT standard for supporting Ethernet over telephone wiring.

The Institute of Electrical and Electronics Engineers, Inc. issued a statement that said the advertisements are not authorized by the IEEE and do not accurately reflect the state of the standards development process. The statement did not cite which ads could be misleading, and IEEE officials could not be reached for comment.

The IEEE made clear that vendors should not refer to 10BaseT as an IEEE standard since it is still in the working group stage and not an approved standard. In fact, the proposed 802.3 10-BaseT has not even been voted on in its final draft status, according to the IEEE.

"Until the IEEE Standards Board approves a proposed standard, there is no standard," according to the statement.

The IEEE is not authorized to engage "in product testing or in certification of products or systems to comply with IEEE standards," according to a portion of the IEEE statement that cited the organization's Standards Manual. Therefore, the IEEE "will not permit its name to be used to suggest any product or system complies with IEEE standards."

Finger pointers

Vendors contacted by *Network World* that have rolled out Ethernet-over-twisted-pair wiring products said they have not run misleading ads or press releases themselves. But many were quick to point fingers at some of their competitors for using unfair claims about having 10BaseT-compliant products as "zingers" in their ads.

Misleading ads for Ethernet-over-twisted-pair products have been a hassle, said Roger Bertman, group director of product marketing at Ungermann-Bass, Inc. Ungermann-Bass introduced its first Ethernet-over-twisted-pair products in January 1988.

"We basically say that we are no more and no less compatible with 10BaseT than anybody," Bertman said. "But we find this is something we get into a discus-

(continued on page 18)

INDUSTRY BRIEFS

Hewlett-Packard Co. recently said it will lay off about 330 employees at its Apollo Division as part of a further consolidation of operations at the subsidiary, which it acquired last May.

The personnel cuts will hit Apollo's Product Repair Center in Chelmsford, Mass., its manufacturing plant in Exeter, N.H., and various other departments in Chelmsford. HP is making the cuts in an effort to eliminate duplicate functions. The consolidation will reduce the number of employees at Apollo from 2,434 to about 2,100, a company spokesman said. As part of a consolidation earlier this year, HP cut about 100 corporate positions at Apollo. HP also announced that Apollo will now take on exclusive responsibility for the design and development of HP's Reduced Instruction Set Computer-based workstations.

AT&T and **Western Union Corp.** last week announced they will link their public electronic mail services to enable both companies' E-mail users to swap messages for the first time.

The two companies connected AT&T Mail and Western Union's EasyLink services via X.400 gateways.

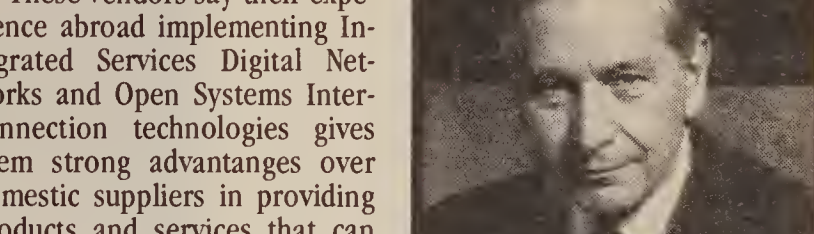
The X.400 link with Western Union is the 10th such agreement involving AT&T this year. AT&T has made similar announcements with Dialcom, Inc., Telenet Communications Corp. and seven foreign E-mail service provider interconnections this year. The agreement marked Western Union's first such agreement. Western Union, which is based in Upper Saddle River, N.J., has about 200,000 user mailboxes on its EasyLink network and a transmission volume of more than eight million messages a month.

AT&T refused to reveal how many mailboxes are on its

(continued on page 18)

Voice mail service market to skyrocket

	Revenue in millions of dollars	
	Mid-1989	Mid-1994
Independent service bureaus	$165	$565
Telephone companies	NA	$638
Cellular telephone companies	$25	$256



GRAPHIC BY SUSAN J. CHAMPENY — SOURCE: PROBE RESEARCH, INC., CEDAR KNOLLS, N.J.

European vendors expand U.S. presence

Firms seek role as global net providers; rely on strategic alliances, buyouts to gain market share.

By Gail Runnoe
Washington Correspondent

European equipment and service providers are bolstering their presence in U.S. communications markets, trying to win customers by positioning themselves as global net suppliers.

British Telecommunications, PLC, Siemens AG, Groupe Bull SA and LM Ericsson are relying upon a mix of strategic alliances and acquisitions to improve their position in key markets.

These vendors say their experience abroad implementing Integrated Services Digital Networks and Open Systems Interconnection technologies gives them strong advantanges over domestic suppliers in providing products and services that can operate in nationwide networks or as part of global enterprisewide nets.

"Large users are global users," said Arthur Bushkin, vice-president of the telecommunications practice at A.T. Kearney, Inc., a Boston-based international management consulting firm. Users want global vendors, and to achieve that status, it is necessary for foreign vendors to form alliances in new markets, he said.

Bull by the horns

Bull HN Information Systems, Inc., the U.S. subsidiary of Groupe Bull, for example, recently announced it will acquire Zenith Electronics Corp.'s computer division.

Earlier this year, Siemens purchased Rolm Systems, Inc. from IBM, giving it immediate market clout in the domestic private branch exchange market after years of struggling to gain recognition on its own. Siemens and IBM also formed a joint venture, Rolm Co., that will market the Rolm products.

British Telecom International, Inc., the U.S. subsidiary of the British carrier, has also invested heavily in a string of U.S. telecommunications companies since 1984, when it set up shop in New York. Most recently, the company announced its intention to purchase for $355 million McDonnell Douglas Network Systems Co., which includes the

British Telecom's Michael Ford

Tymnet public packet-switched data network.

"Our strategy is to develop alliances to provide network solutions for global companies," said Michael Ford, president of British Telecom.

"Customers want to deal with one company and order the whole thing in one place," he said, and British Telecom's strategy of forging agreements with international carriers has been a "a direct response to users' demands to simplify the ordering process."

In addition to its voice network services, British Telecom also offers electronic mail and information services through its Rockville, Md.-based wholly owned subsidiary, Dialcom, Inc.; voice messaging through Voice

(continued on page 17)

You improve them.

Our Hayes PC communications products are regarded as the best in the world. But we're not about to rest on our laurels.

That's why we're adding more advanced features to many of our existing products. And more products to our line.

A line that already includes the right modem for virtually every communications need, no matter how simple or complex.

And new PC fax cards that let the PC world communicate with the fax world.

As well as software that contains features to make advanced communications easier.

What's more, we've lowered the prices of many of our higher

When you've set the standa for one decade, what

speed and advanced feature products, to make them more compatible with most budgets.

Of course, we're making sure that our products will be compatible with the future, too. Which is why you can always depend on your current Hayes modem to work with every new one we develop.

It's also why we're at the forefront of such important technologies as ISDN.

And why the only choice in computer communications equipment today will still be the only choice tomorrow.

For more information about Hayes products and the location of your nearest dealer, call 1-800-635-1225.

Hayes®

Our technology has the computer world talking. More than ever.

rds for PC communications do you do for the next?

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ON OCTOBER 12th, NORTHERN TELECOM INTRODUCED FIBERWORLD. IT WILL IMPROVE THE PERFORMANCE, CAPACITY AND VALUE OF VIRTUALLY EVERY PIECE OF COMMUNICATIONS EQUIPMENT IN AMERICA...

NO MATTER WHO MADE IT.

In one bold step, Northern Telecom changed the way every one of us will live and work into the 21st Century.

We call it FiberWorld. And it's our vision of a fiber-optic network that will transform forever the way information is exchanged.

It's a broadband network almost 3,000 times faster and with 30,000 times the capacity of present systems.

A network compatible with the equipment of practically every manufacturer.

A network based on international standards for a Synchronous Optical Network, or SONET.

And it all starts today with the introduction of these FiberWorld products:

S/DMS AccessNode—Gives subscribers direct access to the FiberWorld network at the rate of 600 Mb/s.

S/DMS TransportNode—SONET-based fiber-optic transport networks handle DS-1 and DS-3 traffic as well as OC-3 through OC-48 transmission up to 2.4 Gb/s.

A SONET-based, "long-haul" digital radio system that functions at a capacity of 600 Mb/s.

S/DMS SuperNode—A multi-function SONET-based broadband and narrowband switch, using proven DMS SuperNode architecture, that lets telephone companies access new information services markets.

There's nothing else like FiberWorld. Anywhere.

To learn more on how FiberWorld can help your company right now, talk to a Northern Telecom representative at 1-800-543-9806.

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European vendors expand U.S. presence

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Com Systems, Inc., a San Francisco-based company it bought a 28% interest in; radio paging through Metrocast, a San Diego-based company it owns an 80% interest in; and cellular services through McCaw Cellular Communications, Inc., which British Telecom has a 22% interest in.

Faced with growing competition at home and tight regulatory constraints, British Telecom's strategy has been to "diversify our telecom activity outside of England into markets where we can grow," Ford said.

Although revenues have been growing for British Telecom in its home markets, the company has been losing market share ever since competition was introduced into England's long-distance and customer premises equipment markets in 1981, Ford said.

Innovation hungry

Bull HN said it has focused on U.S. markets purely for the revenue opportunity and technological innovations here.

"There are some leadership technologies in the U.S.," said Stephen Gardner, Bull HN's vice-president of small systems product line management.

The company is particularly attracted to electronic data interchange, which Gardner said he believes Bull HN can gain considerable knowledge of and then parlay into products it can market worldwide. "We see EDI as a key technology coming out of the U.S.," he said.

One market where Bull HN believes it has a leg up on U.S. competitors is OSI products. "OSI in Europe has been a de facto standard for several years now," Gardner said. "We're in the open systems business on a worldwide basis. That's really our selling message to the large multinational customer."

Like Bull HN, Siemens believes it also holds a technological edge over U.S. counterparts. Its expertise, however, lies in ISDN.

"In Europe, we have sold [ISDN] systems for several years," said Leonhard Bauer, vice-president of the communications systems and network group at Siemens Information Systems, Inc.

Siemens provides ISDN networking enhancements for its Saturn line of PBXs in the U.S. and will provide similar enhancements for Rolm products.

Bauer said the U.S. market is extremely important to Siemens because 40% of the total worldwide private communications market is located here.

"One of the reasons we acquired Rolm was to get a better stake in that market," he said. "It would have taken us a lot longer to build business on our own."

Siemens has opted to manufacture products in the U.S., part of the company's overall belief that it must build equipment in the country in which it sells so it can be closer to the market and respond quickly to it, Bauer said. "We have to develop products that meet the needs of the market and the customer," he said. Saturn PBXs, Rolm PBXs and some public switches are manufactured in the U.S.

Thomas Mercer, principal consultant with A.T. Kearney, however, said Siemens and LM Ericsson must commit more technical development staff in the U.S. if they want to capture more U.S. market share.

"AT&T and Northern Telecom, Inc. can execute development of product enhancements faster because they have technical teams based here."

LM Ericsson's U.S. subsidiary, Ericsson North America, Inc., has targeted the cellular and mobile communications market in the U.S., but it also sells PBXs and central office equipment.

Mercer said that LM Ericsson could have more success in these markets if it allied with a domestic supplier that could help them get products to market quicker.

Peter Bergenhag, vice-president of investor relations at Ericsson North America, said the company signed a joint venture agreement with General Electric Co. last August to develop and market cellular and mobile data communications products. That agreement gives LM Ericsson access to a vast U.S. distribution network and manufacturing capacity at GE factories, he said.

A European sample

Company	U.S. subsidiaries	Markets
British Telecommunications PLC London	British Telecom International, Inc. New York	Electronic mail and information services, mobile and cellular communications, paging services, international corporate networks, customer premises equipment, including PBXs and key systems.
Groupe Bull SA Paris	Bull HN Information Systems, Inc. Billerica, Mass.	Mainframes, minicomputers, personal computers, integrated networks for the Distributed Systems Architecture, SNA and OSI environments, network management services.
LM Ericsson Stockholm, Sweden	Ericsson North America, Inc. Richardson, Texas	PBXs, central office equipment, cellular communications.
Siemens AG Munich, West Germany	Rolm Co. Norwalk, Conn.	A joint venture with IBM to market PBX equipment.
	Rolm Systems, Inc. Santa Clara, Calif.	PBXs and related peripherals.
	Siemens Communications Systems, Inc. Boca Raton, Fla.	Central office switching and transmission systems.
	Siemens Information Systems, Inc. Boca Raton, Fla.	PBXs, key systems, hybrid PBX/key systems.

So much hangs in the balance.

In this business, you can't afford surprises.

Meet Colleen Auchter. Student balloon pilot and Telecommunications Manager for Wang Financial Information Services.

If there's one thing Colleen has learned from her ballooning experience it's this: Be prepared for anything. Anticipate the unexpected. Because when you're thousands of feet in the air, you simply can't afford any surprises. You have to be able to rely on your decision-making skills . . . and your equipment.

The same holds true in Colleen's job at Wang Financial. The decisions she makes in selecting a private-line vendor are absolutely critical. Especially when you consider that Wang Financial uses private lines to supply money managers, banks and brokers with real-time stock market information. At any given moment, vital information that translates into multi-million-dollar transactions is crossing the lines through Wang Financial's SHARK® service. And if there's an interruption in transmission . . . well, that's serious trouble.

Obviously Wang Financial's customers demand consistently reliable service. Wang Financial, in turn, demands the same from **Williams Telecommunications Group (WTG)**. And gets it.

"These circuits are our lifeline. Our business depends on accurate, real-time information," Colleen explains. "We have to go with reliable vendors. And WTG has proven reliability."

The fact is, no other company sets higher standards for availability than WTG. But in Wang Financial's business, where data transmission is critical, they must take every precaution. And that means back-up systems. Just in case. So Colleen counts on WTG to provide Wang Financial with route diversity as well.

"Buying multiple circuits from WTG is efficient and economical," Colleen says. "WTG has the route diversity Wang Financial needs."

So if you're still up in the air about which telecommunications vendor to choose, call WTG at 1-800-642-2299, or your local WTG sales office, and ask about our new route diversity offering for your voice, data, or video private-line services. No other company gives you a higher level of service.

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See the FAXNeT Form on Page #91

Unix groups join forces to ensure interoperability between standards

By Gail Runnoe
Washington Correspondent

CAMBRIDGE, Mass. — The Open Software Foundation (OSF), Unix International, Inc. and AT&T's Unix Software Operation last week said they will intensify efforts to create greater interoperability between the OSF and Unix Software Operation versions of Unix.

The three groups are negotiating to establish a standard mix of user interfaces, network file systems, transport protocols and other elements used in the operating system software to ensure interoperability between the two systems at the application level. That would allow users to connect systems running Unix System V Release 4.0 with systems using OSF/1 in a network and share data base and transaction processing applications.

Unix System V Release 4 and OSF's OSF/1, due to be released at the end of 1990, are compatible at the operating system interface level, a Unix Software Operation spokesman said. This lets software developers write applications that run under both operating systems, which could result in greater application availability.

While no formal recommendations have been made yet, Larry Dooling, president of Unix Software Operation, said initial discussions will focus on identifying potential technology exchanges and agreeing on processes for specifying future Unix system requirements.

The spokesman said it is possible that ensuing talks will result in the incorporation of some OSF/1 features into enhancements of Unix V Release 4, and vice versa.

"There is more commonality than difference between Unix V.4 and the OSF product," he said.

David Tory, president and chief executive officer of OSF, said the three groups "share a common goal — unification of the open systems industry." Tory said he is optimistic the three will be able to "work together for the benefit of users."

IEEE warns of false ads

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sion on with most of our customers after they have met with our competitors because our competitors say they are 10-BaseT-compliant and they tell their customers to make sure Ungermann-Bass is as well."

Vendors that have claimed conformance with 10BaseT are creating confusion for some users, agreed Patricia Thaler, who chairs the IEEE 10BaseT Task Force and is principal engineer at Hewlett-Packard Co.'s Roseville, Calif., Networks Division.

"I think it's confusing to the extent that some customers buy products that vendors claim conform to a standard that has not been finalized," Thaler said. "These vendors might eventually have to make changes to their products."

Kit Waugh, market segment manager for Crossbow distributed Ethernet hubs at Fibermux Corp. in Chatsworth, Calif., said he tells customers that his company's products comply with the latest 10BaseT draft standard and that its engineers "are poised to have the products meet the final standard when it's set."

Bill Swift, product manager for 3Com Corp.'s new line of Ethernet-over-twisted-pair wiring products, said misleading ads have become less common during the past year. 3Com earlier this month introduced its Ethernet-over-twisted-pair offerings ("3Com unwraps network control, 10-BaseT tools," *NW,* Nov. 6).

Vendors involved with the IEEE 10-BaseT Task Force said they expect 10-BaseT to become a final standard within a year, possibly by next summer.

Industry Briefs

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network. Eric Arnum, editor of *Electronic Mail & Micro Systems*, a Forest Hills, N.Y.-based newsletter, estimates that AT&T has about 80,000 mailboxes on its AT&T Mail network. That net supports about three million messages a month.

Home Shopping Network, Inc. (HSN) recently announced a settlement of all claims arising from the $1.5 billion lawsuit it brought in 1987 against **GTE Corp.** for allegedly selling it network equipment and services that failed to work as promised.

HSN lost the lawsuit in August.

Under the settlement, GTE will receive a cash payment of an undisclosed sum from HSN's insurance carriers in return for dropping all other claims.

The settlement relieves HSN and its top executives of all liability under GTE's counterclaim that charged the St. Petersburg, Fla.-based firm with libel.

Infotron Systems Corp. of Cherry Hill, N.J., and **Netrix Corp.** of Herndon, Va., recently signed a joint technology and product development agreement.

The agreement is expected to lead to enhancements to both companies' product lines, improved interoperability of Netrix packet-switching equipment with Infotron Systems' StreamLine packet-switch products, as well as new Integrated Services Digital Network Primary Rate Interface products.

Under a previous agreement, Infotron introduced the StreamLine 25 packet/circuit switch using Netrix technology.

Times change. Is your network extending out of view?

Keeping your eye on two or three LANs was pretty straightforward. But now that you're at six Ethernets and counting, you have a new challenge. You need a set of tools to monitor and control the individual devices in your network–no matter where they might be. You need the ACS 4800, a centralized network management system.

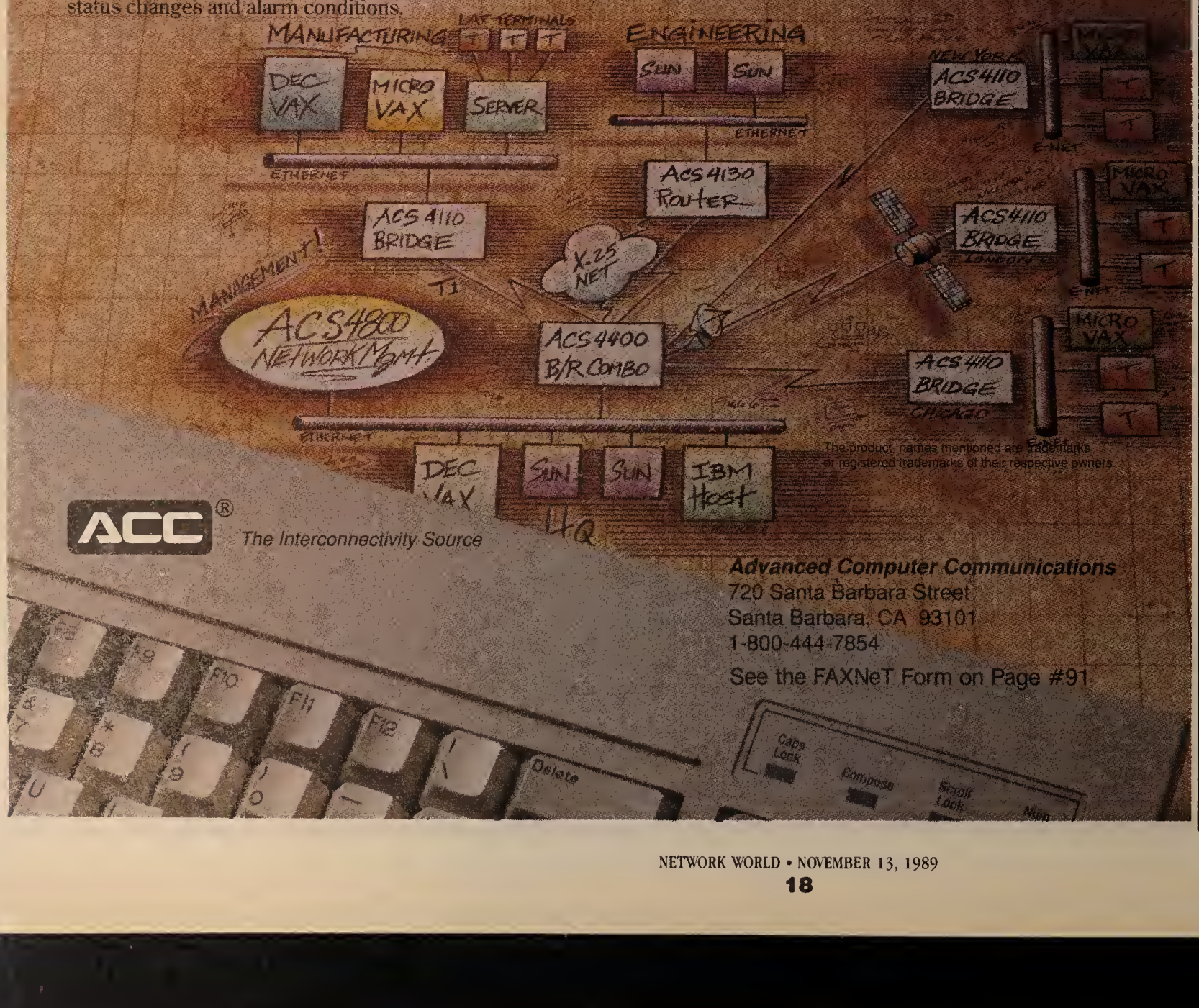
The ACS 4800 gives you a continuous window on network performance.

The heart of this system is a unique graphical interface driven by a mouse and icons. Just click on a symbol to build the network map, update the Rolodex-style database, plot real-time statistics, or view status changes and alarm conditions.

The ACS 4800 manages devices from a score of vendors.

Like all ACS Series 4000 internetworking products, the ACS 4800 supports SNMP–the Simple Network Management Protocol. You can implement its distinctive features to monitor a multitude of devices that also support this de facto standard for network management.

For more information on the ACS 4800 and the entire ACS Series 4000 line of adaptable internetworking products, call ACC today at **1-800-444-7854**.



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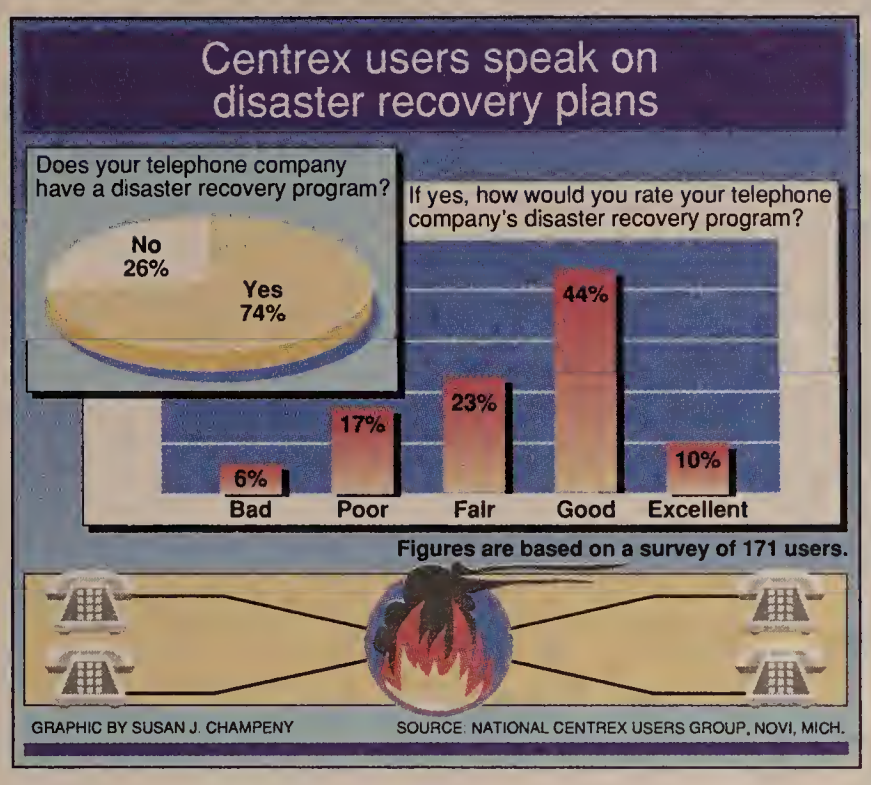
See the FAXNeT Form on Page #91

Worth Noting

"Today's children are tomorrow's work force. If we don't invest in [them] now, they won't be able to compete for us later.

Robert Allen
Chairman
AT&T



Carrier Watch

Voicemail International, Inc., a voice-meesaging system vendor based in Santa Clara, Calif., last week announced the sale of its Voicemail system to **France Cable et Radio (FCR).**

FCR will use Voicemail to provide international voice-messaging services to businesses throughout France. The FCR service center is scheduled to begin operation in early 1990. Voicemail systems are alrrady in use in the U.K., West Germany, Italy, Japan, Korea, Spain, Switzerland, Sweden and Taiwan, according to a Voicemail International spokesman.

A recently released report said that deployment of broadband Integrated Services Digital Networks is not a high priority for U.S. telephone companies and interexchange carriers, and that widespread implementation of the advanced network service will not begin until 1998.

In its report **"Broadband ISDN Market,"** Tulsa, Okla.-based **Trans-Formation, Inc.** says carriers have focused their attention on provision of narrowband ISDN and have devoted only minimal resources to broadband ISDN.

The study, which examines the strategies of 23 major carriers, says major changes must be made to switching networks, including deployment of asynchronous transfer mode packet switches, to support broadband ISDN.

For information about the study, which is priced at $995, contact the company at (918) 250-5250.

Wang DVX II enhancements ease networking, control

Tools expand voice messaging unit's capabilities.

By Jim Brown
Senior Editor

NEW YORK — Wang Information Services Corp. (WISC) last week rolled out products that improve links between its DVX II voice-messaging units and allow a central site operator to control remote DVX IIs.

WISC, a subsidiary of Wang Laboratories, Inc., also announced software that automatically transfers data entered from push-button telephones from the DVX II to a Wang VS minicomputer. The announcements were made at the Messaging '89 conference here.

The products complement WISC's release last month of DVX MultiMail software, which automatically notifies Wang Office and IBM Professional Office System (PROFS) electronic mail users when they have voice-mail messages waiting.

The initial version of DVX MultiMail, running on the DVX II, transmits message-waiting notification to a Wang VS minicomputer, which directly notifies Wang Office users or uses the VS-based Wang/PROFS Gateway package to notify PROFS users. WISC will add capabilities to notify X.400 users and other proprietary E-mail systems later.

At Messaging '89, WISC introduced Enhanced Digital Networking (EDN) software for the DVX II, a Unix-based voice processor manufactured by Digital Sound Corp. of Santa Barbara, Calif., that is resold by WISC.

EDN, which was developed by WISC, will allow up to 40 DVX IIs to be linked together via an Ethernet local-area network supporting Transmission Control Protocol/Internet Protocol or wide-area links operating at up to T-1 speed. EDN software prices start at $4,800 for each DVX II.

Existing releases of DVX II networking software enable users to connect up to 40 DVX IIs over wide-area links operating at 19.2K bit/sec.

Digital networking enables messages on one DVX II to be forwarded to mailboxes on another DVX II. Each DVX II supports up to 20 phone lines and up to 3,000 mailboxes, making a network of DVX IIs capable of supporting up to 800 phone lines and 120,000 mailboxes. The DVX II is the successor to the DVX I, a Wang-developed product.

> The products complement WISC's release last month of DVX MultiMail software.
>
> ▲▲▲

EDN also allows each DVX II in the network to maintain a data base containing the names of all users in a network, said Jeff Graham, director of product development for WISC's voice services and products division.

This helps a user trying to leave a voice message for a user on another system, ensuring the message is being routed to the right mailbox. When the telephone extension of the intended recipient is entered, the DVX II will speak the name of the user associated with that extension.

(continued on page 22)

Users offer tips on building global nets

Network managers say careful assessment of PTTs, international carriers is key to success.

By Bob Wallace
Senior Editor

In building an international network, users should carefully evaluate the policies and offerings of foreign PTTs and scrutinize the services of international carriers.

That's the advice of network managers from multinational corporations who warn that setting up network operations in countries with inflexible telecommunications authorities and limited service or equipment offerings can make global networking a major headache.

Edward Ziesche, international telecommunications administrative manager for Cargill, Inc., a chemical product maker and financial services firm based in Minneapolis, said users should set up shop in countries with modern telecommunications networks, where post, telegraph and telephone administrations offer easy access to other carriers and price services reasonably.

After conducting an exhaustive evaluation years ago, Cargill chose to locate the hub of its European voice/data network in Geneva. Facilities throughout the continent are linked to the hub using 64K and 128K bit/sec terrestrial links.

"We chose Geneva because it was very easy and cost-efficient to do business with Radio Swiss [the country's dominant carrier] and the Swiss PTT," Ziesche said.

But in recent years, it's become cheaper to do business in the U.K., he said.

"The U.K. used to be far more rigid in the way it handled telecommunications," Ziesche said. "But they've become increasingly flexible and have made it easier to do business. We've found British Telecom to be very aggressive in pricing and very accommodating in terms of meeting our business communications needs."

Despite the change, Cargill has decided against completely transplanting its Geneva operations to London but has gradually relegated the Swiss facility to backup status. "We have shifted many of the services offered from Geneva to London and are using the U.K. site to launch new ones," Ziesche said.

(continued on page 24)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T to offer 800 number purchasing abroad. Corporations using AT&T's 800 services will be able to market their wares to international customers beginning Dec. 18 if the Federal Communications Commission approves a new service plan filed by the carrier last week.

AT&T's USADirect offering would allow calling card customers in international locations to dial 800 numbers supported by AT&T's standard 800, Megacom 800 and 800 Readyline services.

International access to 800 numbers is not available for international direct-dial or collect calls. Callers will be charged AT&T's international operator station rates for the length of the call.

In its filing with the FCC, AT&T said the service will make it easier for business travelers, military personnel and U.S. citizens living abroad to purchase goods and services from the U.S.

AT&T said the service potentially would be used by the more than one million U.S. civilians and 329,000 military personnel living in Australia, France, West Germany, Italy, Japan, the Phillipines, South Korea and the U.K.

The carrier estimated that the new service would yield revenue of $1.4 million during the first year, an amount that would likely increase to $6.27 million in 1992.

MCI using PTAT net for international calls. MCI Communications Corp. last week announced it has begun

(continued on page 22)

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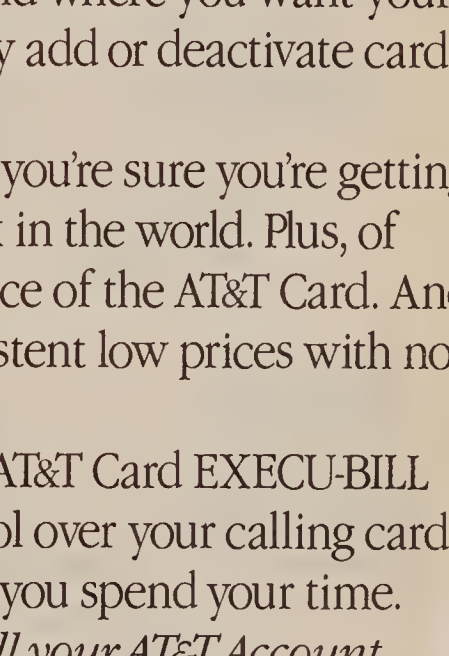
Instead of spending your time fishing through your calling card charges, now you can spend your time fishing.

Introducing AT&T Card EXECU-BILL℠ service. A flexible new billing service that gives you a more efficient way of tracking and managing your AT&T Card usage.

With AT&T Card EXECU-BILL service, you can tailor your billing to suit the way your company works. For example, you can specify which departments and individuals get bills or reports and what information you want them to have. You can even get special reports to summarize charges or flag heavy card usage.



What's more, you get a variety of monthly management reports that help you administer your corporate card program, analyze charges and identify abuse.

AT&T Card EXECU-BILL service also comes with options such as usage data on magnetic tape and custom card design. You choose how and where you want your cards distributed and can easily add or deactivate cards.

But that's not all.

With EXECU-BILL service, you're sure you're getting AT&T, the most reliable network in the world. Plus, of course, the ease and convenience of the AT&T Card. And you're guaranteed AT&T's consistent low prices with no surprises.

All of which means with AT&T Card EXECU-BILL service, you'll have better control over your calling card expenses. Not to mention how you spend your time.

For more information, call your AT&T Account Executive or 1 800 222-0400.

AT&T
The right choice.

Enhancements ease networking

continued from page 19

To help manage data bases containing names of network users, WISC introduced the Centralized Administration Node (CAN), a Unix-based workstation running WISC-developed DVX II management software.

The CAN supports an Informix relational data base management system that maintains a central data base reflecting the configuration and user information stored on each DVX II in the network.

The CAN is attached to the diagnostic port of a central site DVX II and automatically polls each DVX II in the network to collect status and performance information. The CAN can also act as a control console capable of downloading configuration and data base updates to remote DVX IIs.

"As these DVX II networks have grown, customers have been asking for centralized network administration tools," Graham said.

Previously, each DVX II was controlled via an attached asynchronous terminal. Alternatively, users could have a central site, asynchronous terminal capable of dialing out to each remote DVX II.

Graham said that, in addition to a CAN, users can continue to use asynchronous terminals to control and configure local DVX IIs. The asynchronous terminals can be used to enter changes to the local data base, such as when new mailboxes are added or when old ones are deleted. Before the local data base can be updated, the information is collected by the CAN, which records the changes in the central data base. The CAN then downloads the changes to the data bases of all DVX IIs in the network.

"By keeping the Centralized Administration Node involved in all updates, we're maintaining the integrity of the networkwide data base," Graham said.

The CAN, which includes a Wang PC 382 and software, costs $15,700.

Lastly, WISC introduced FORMServer software that enables the DVX II to collect information entered from push-button phones and forward it via Ethernet to a Wang VS for processing. The product consists of software running on both the VS and DVX II attached to the same Ethernet.

> "As these DVX II networks have grown, customers have been asking for centralized network administration tools," Graham said.
>
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On the DVX II, FORMServer works with Digital Sound's Forms software. Forms enables users to create, for example, an order-entry application in which a series of voice prompts ask callers to enter data, such as an account number on push-button phones. Previously, that information was stored on the DVX II and had to be transcribed before the order was entered on a computer.

With FORMServer, data collected by the DVX II is passed to the VS where it can be loaded directly into an order-entry application for processing. In addition, FORMServer software on the VS can create an order confirmation notice and route that notice to VS-based Wang Office Fax Gateway software. Customers then receive the notice via facsimile.

FORMServer costs between $10,000 and $13,000.

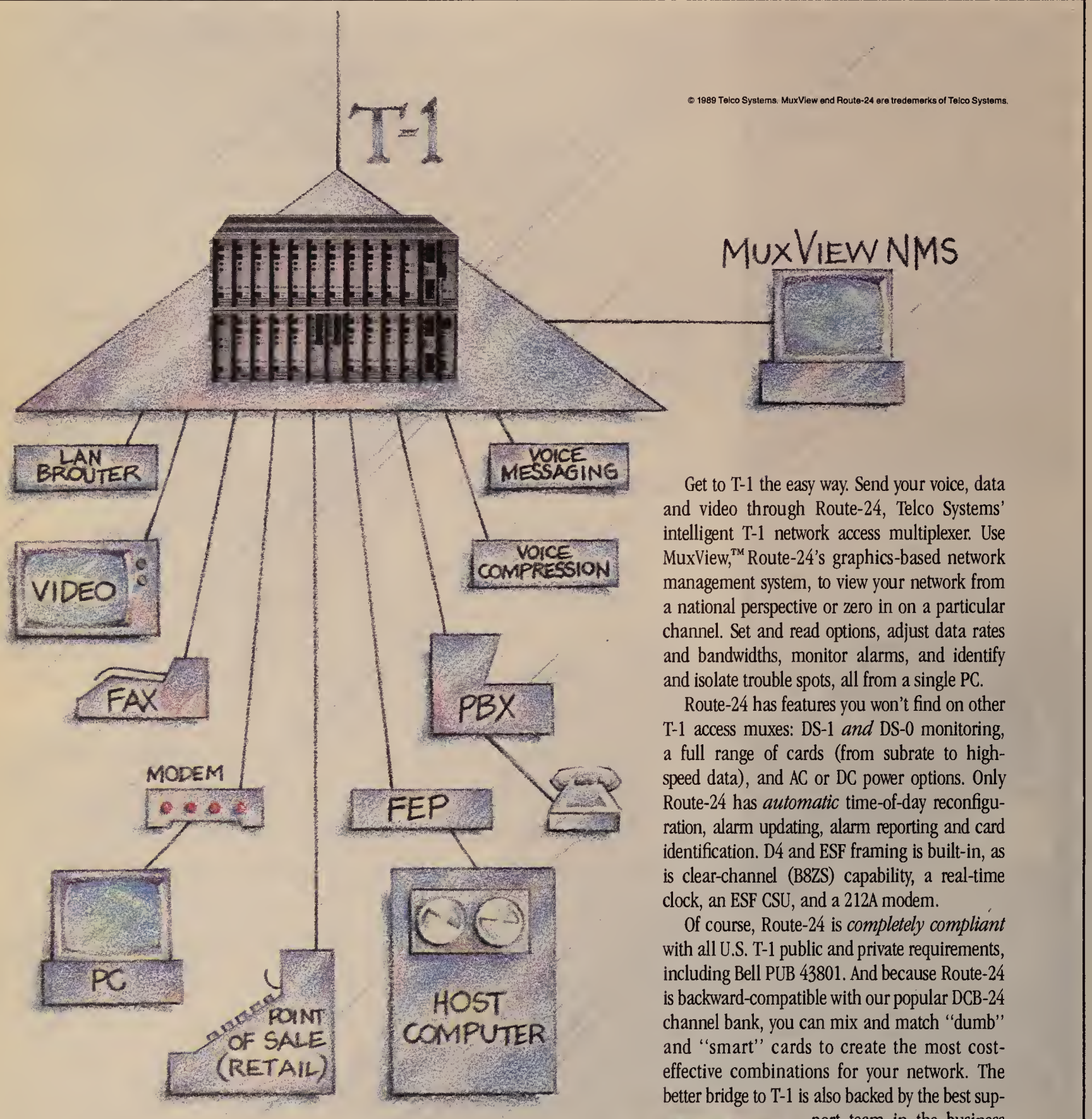
Washington Update

continued from page 19

carrying international calls on the Private Trans-Atlantic Telecommunications (PTAT) network, an undersea fiber-optic cable owned jointly by US Sprint Communications Co. and Cable & Wireless PLC in the U.K.

MCI said it began providing the service to an unnamed customer that is using a T-1 circuit between the U.S. and Europe.

MCI said it now uses three separate transatlantic communications facilities: PTAT; TAT-8, a fiber-optic cable in which the carrier owns a 3.8% interest; and its Skyline International Business Service satellite service.



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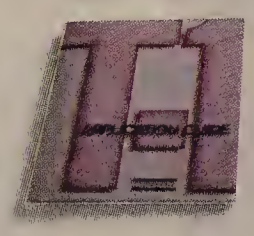

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Army Reserve gets customized 800 service under AT&T Tariff 16

By Gail Runnoe
Washington Correspondent

ST. LOUIS — The U.S. Army Reserve Personnel Center here recently contracted for a customized 800 calling service provided under AT&T's Tariff 16, which is specifically designed for government users.

The deal comes on the heels of a Tariff 16 arrangement offered to the state of Pennsylvania last month ("AT&T files Tariff 16 plan for state of Pennsylvania," *NW*, Oct. 30). It is the fifth Tariff 16 deal AT&T has signed to date.

Under the three-year contract, AT&T will direct voice traffic originating in the U.S., Puerto Rico and the U.S. Virgin Islands to its St. Louis point of presence for delivery over T-1 lines to the Army's three personnel centers there.

The personnel center handles all the records of active and retired members of the Army Reserve and their beneficiaries.

Dubbed the St. Louis Inbound Calling Service (SLICS), the arrangement will not cover operator-assisted calls, such as person-to-person, collect, third-number billed or conference calls.

AT&T expects to earn about $3 million over the life of the five-year contract.

AT&T devised its SLICS offering in response to a competitive bid solicitation, to which MCI Communications Corp. also responded. According to Kim Ramirez, chief of the U.S. Army Commercial Communications Office's technical programs branch, both MCI and AT&T submitted technically qualified proposals, but AT&T's price was lower. Ramirez declined to discuss differences in pricing.

Ramirez said the personnel center will save about $112,000 annually over what it pays AT&T and MCI for inbound voice service. Outbound service is currently provided by ITT Metromedia Long Distance, she added, but that contract is expected to be rebid by the end of the year.

SLICS rates are mileage-sensitive. The price per minute, for example, of a 200-mile call is 9.6 cents, while a 1,000-mile call and a 5,000-mile call are 12.4 cents and 19.4 cents, respectively. Calls are billed for a minimum of one minute, with six-second increments thereafter. SLICS rates are slated to go into effect Dec. 14.

> The personnel center will save about $112,000 annually.
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According to the SLICS contract, the Army can terminate the service at any time with 30 days' written notice.

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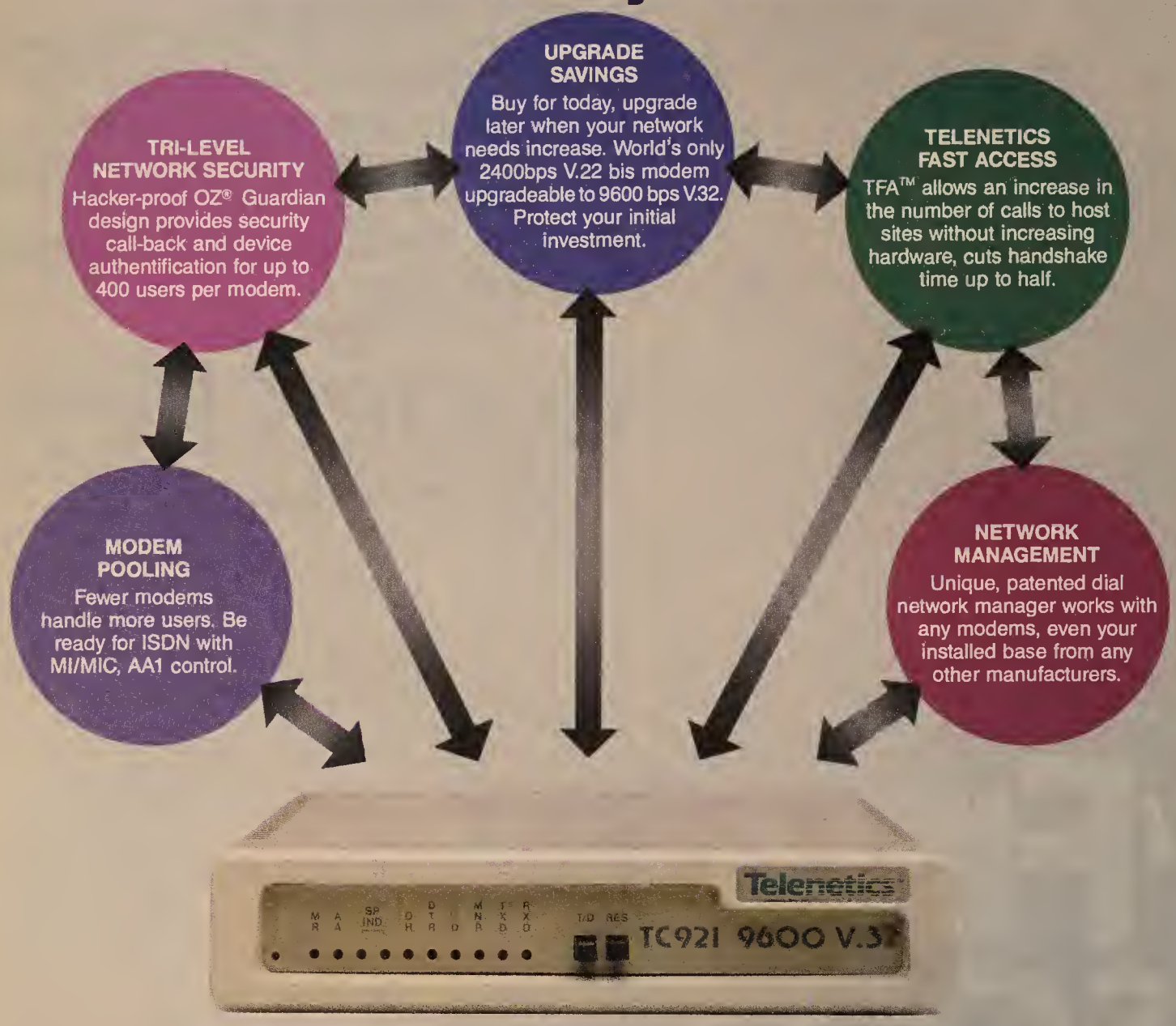

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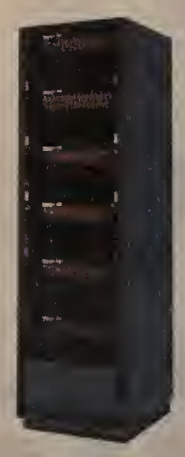

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Users offer tips on building global nets

continued from page 19

When evaluating international carriers, users said global network coverage is just as important as flexibility and pricing.

"Once you've been told where the network is going, you have to decide which carrier, if any, can take you there," said Robert Crowley, business systems manager for Trans Freight Lines, a major freight shipping firm based in Wayne, N.J.

Selecting a single carrier to serve the firm's overseas sites was a long and arduous process for Trans Freight, according to Crowley. "The biggest problem you run into is that not everyone goes everywhere you want them to," he said.

Trans Freight evaluated international net services from companies including GE Information Services (GEIS), McDonnell Douglas Network Systems Co. and several others before deciding on GEIS. "They all do a good job serving the U.S. and covering European countries, but once you get outside that area, they all start falling apart," Crowley said.

When evaluating international carriers on coverage, users should take a hard look at carriers' plans to deliver traffic to countries outside the reach of their networks, Crowley said.

Many international carriers sign so-called "correspondence agreements" with carriers in countries they don't serve. The far-end links provided under these arrangements vary widely in quality, he said.

"Correspondence agreements are hit or miss, depending on what part of the world you're trying to reach," he said.

Other users, including Cargill's Ziesche, are less concerned with what steps the carriers take to deliver traffic to remote sites. "How an international carrier gets the information to its destination is of little consequence to us as long as we have good reliable connections," he said.

Crowley said dealing with the PTTs can be a trying experience. "The PTTs vary widely among countries. Some are great, while others are terrible," he added.

Crowley said users are sometimes tempted to bypass the PTTs to get things done. One international firm, which he declined to identify, grew tired of dealing with the Indian PTT and decided to install very small aperture terminals on the roofs of its offices throughout the country.

"They brought the [VSATs] on-line and then found that during the dry season, the hydroelectric power frequently goes down, [and] the government shuts off electricity for four or five hours in the middle of the day," Crowley said.

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Data Packets

Codex Corp. last week announced its intention to support fractional T-1 on its high-speed voice and data digital networking products, including its fast packet T-1 multiplexers. Codex and its strategic partner, **StrataCom, Inc.**, are developing fractional T-1 support for the Codex 6290/6292 line of fast packet T-1 switches, which StrataCom makes and sells as its IPX line. The switches are scheduled to support fractional T-1 by the third quarter of 1990, according to Codex.

Codex has pledged to support fractional T-1 on all future multiplexers that support T-1 speeds or higher.

Amdahl Corp. last week introduced two Unix-based processors, which are intended to fill a gap between the company's Unix-based minicomputers and its mainframes. The new 7300-150 and 7300-250 processors support Amdahl's UTS 2.0 operating system — Amdahl's version of AT&T's Unix System V Release 3.1.

The new processors can be configured as file servers for local networks and support up to 256M bytes of main storage plus 1.6 terabytes of additional on-line storage. The single-processor 7300-150 can support 250 active users, while the dual-processor 7300-250 supports more than 400 users. Scheduled for general availability in January, the units' base prices are $730,000 for the 7300-150 and $1,254,000 for the 7300-250.

Trucking co. satellite net offers edge

By Paul Desmond
Senior Writer

HURST, Texas — Burlington Motor Carriers, Inc. (BMC) is outfitting its 2,000-truck fleet with a two-way mobile data communications system that promises to be a vital cog in the company's plan to serve customers better while also slashing costs.

The satellite-based truck tracking and data communications system is expected to cut BMC's toll-free 800 service costs by 50%. It will also increase driver productivity by obviating the need for drivers to phone in location information, said Thom Russell, director of marketing systems and telecommunications for BMC.

The mobile data net will augment other BMC networking efforts, including a recent cutover to MCI Communications Corp.'s Vnet virtual private network service, which promises to cut voice communications costs by at least 15%, said Scott McKenna, BMC's manager of market planning and analysis.

BMC also operates a network of IBM System/38 minicomputers, for which it is constantly finding new uses, such as a credit card authorization application that will cut costs by $15,000 per month through the elimination of a third-party service provider.

BMC, based here, is the parent company of four regional trucking firms: Monkem Company, Inc. in Joplin, Mo.; Monroe Trucking, Inc. in West Monroe, La.; Stoops Express, Inc. in Anderson, Ind.; and Wingate/Taylor Maid Transportation, Inc. in Albany, Ga.

Each company is charged with finding loads for any BMC-affiliated truck that makes a delivery in its area, although drivers get their instructions from the dispatcher at their home base.

That creates a need not only for truckers to be able to communicate easily with dispatchers, but also for the dispatchers to be able to exchange information with one another.

The mobile data communications network, based on satellite service from Geostar Corp. and hardware from Hughes Network Systems, Inc., takes care of the first requirement, Russell said.

When fully deployed next July, the system will eliminate the

(continued on page 28)

VSAT net may help scientists forecast earthquakes better

By Jim Brown
Senior Editor

GOLDEN, Colo. — The U.S. Geological Survey (USGS) is building a VSAT network to collect data that could help geologists more precisely forecast when earthquakes will strike.

The ability to accurately predict earthquakes will enable geologists to forewarn cities to brace for a big jolt.

Such a warning capability may provide network users with enough time to systematically take down their networks or reroute data to alternate sites, averting the type of net outages many companies suffered in the recent San Francisco earthquake.

"We have a pretty good idea of what the probability of an earthquake is on a long-term basis," said Raymond Buland, a USGS geophysicist who is overseeing the very small aperture terminal project. For instance, Buland said he and one other geophysicist predicted several months ago there was a 30% chance that a major quake would strike San Francisco in the next 20 years.

But society wants a more exact forecasting method, Buland said.

The new VSAT net will transmit sound wave data collected from ground monitoring sites across the country to a data center here. A local-area net of Digital Equipment Corp. MicroVAXes will use that data to perform wave-form analysis, a computer modeling technique that will help geologists pinpoint certain sound wave patterns that occur before an earthquake.

"We have not yet proved that earthquake prediction is actually possible," Buland said. But, he added, geologists hope this modeling technique will help them learn whether earthquakes can be more precisely forecasted.

In addition to collecting data for the modeling application, the VSAT net will help the USGS more quickly detect an earthquake, pinpoint its epicenter, determine its magnitude and identify the the specific locations that felt its full force. This information will be passed to the Federal Emergency Management Agency, as well as to state and local agencies, thus enabling those agencies to respond more quickly to the hardest hit areas.

The net, dubbed the U.S. National Seismic Network (USNSN),

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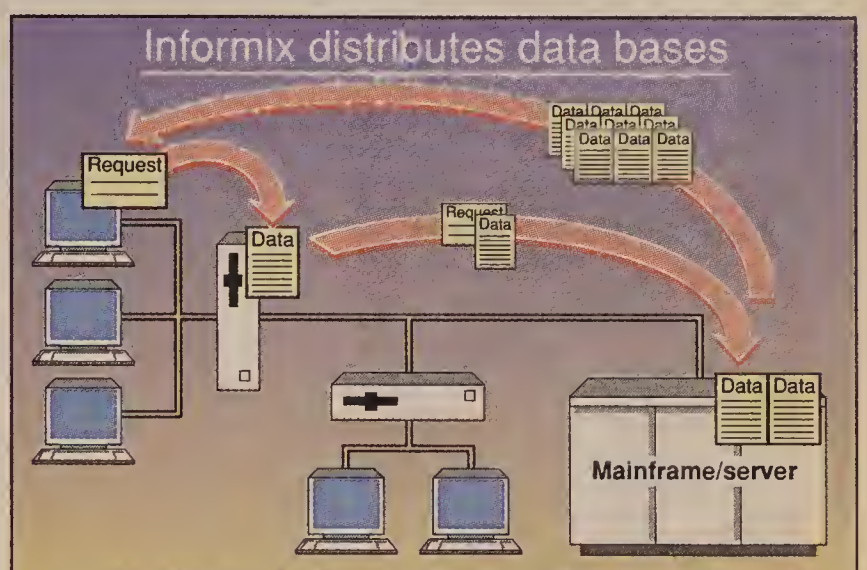


A workstation sends a request to its local network server, which determines where the bulk of the data resides. The local server then forwards its portion of the data to the other server, which pools the data, processes the request and ships the file to the workstation.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INFORMIX SOFTWARE, INC., MENLO PARK, CALIF.

Informix DBMS can tap multiple servers

Software option lets Unix workstations issue a single SQL request to many data base servers.

By Jim Brown
Senior Editor

MENLO PARK, Calif. — Informix Software, Inc. recently introduced software that enables users of an enhanced version of its Unix-based data base management system to retrieve data from multiple network servers.

The new software, dubbed Informix-Star, is an option to the Informix-OnLine DBMS, which the company also rolled out.

Informix-Star enables users of Unix-based workstations running Informix data base applications to issue a single SQL request to retrieve data from multiple Informix-OnLine data base servers attached to Transmission Control Protocol/Internet Protocol- or AT&T StarGroup-based local-area networks.

Remote access

Users can also access data on remote servers if the remote TCP/IP or StarGroup networks are connected via bridges and wide-area network links. Previously, workstation users had to issue separate SQL requests to retrieve data from each server in the network.

"This allows you to spread your data across multiple machines and still access it," said Richard Finkelstein, the Chicago-based principal consultant with DataBase Associates, a nationwide consortium of data base consultants. "To a user, it still looks like the data is on one machine."

Informix-OnLine, announced along with Informix-Star, is an improved version of the Informix-Turbo DBMS. Informix-OnLine supports disk mirroring and storage of data objects (see 'Informix adds disk mirroring to its DBMS," page 30). Both run on Unix-based microcomputers, minicomputers and mainframes.

Initial versions of the software, scheduled to ship by year end, will run on Sun Microsystems, Inc., Hewlett-Packard Co., AT&T and Sequent Computer Systems, Inc. processors. Subsequent releases, due out in 1990, will run on Digital Equipment Corp., Unisys Corp. and Pyramid Technology Corp. processors.

With Informix-Star, users can retrieve data from multiple servers but cannot make changes to that data. Informix needs to build a so-called two-phase commit-protocol into its software before users can issue a single command to change data that resides on multiple servers, analysts said.

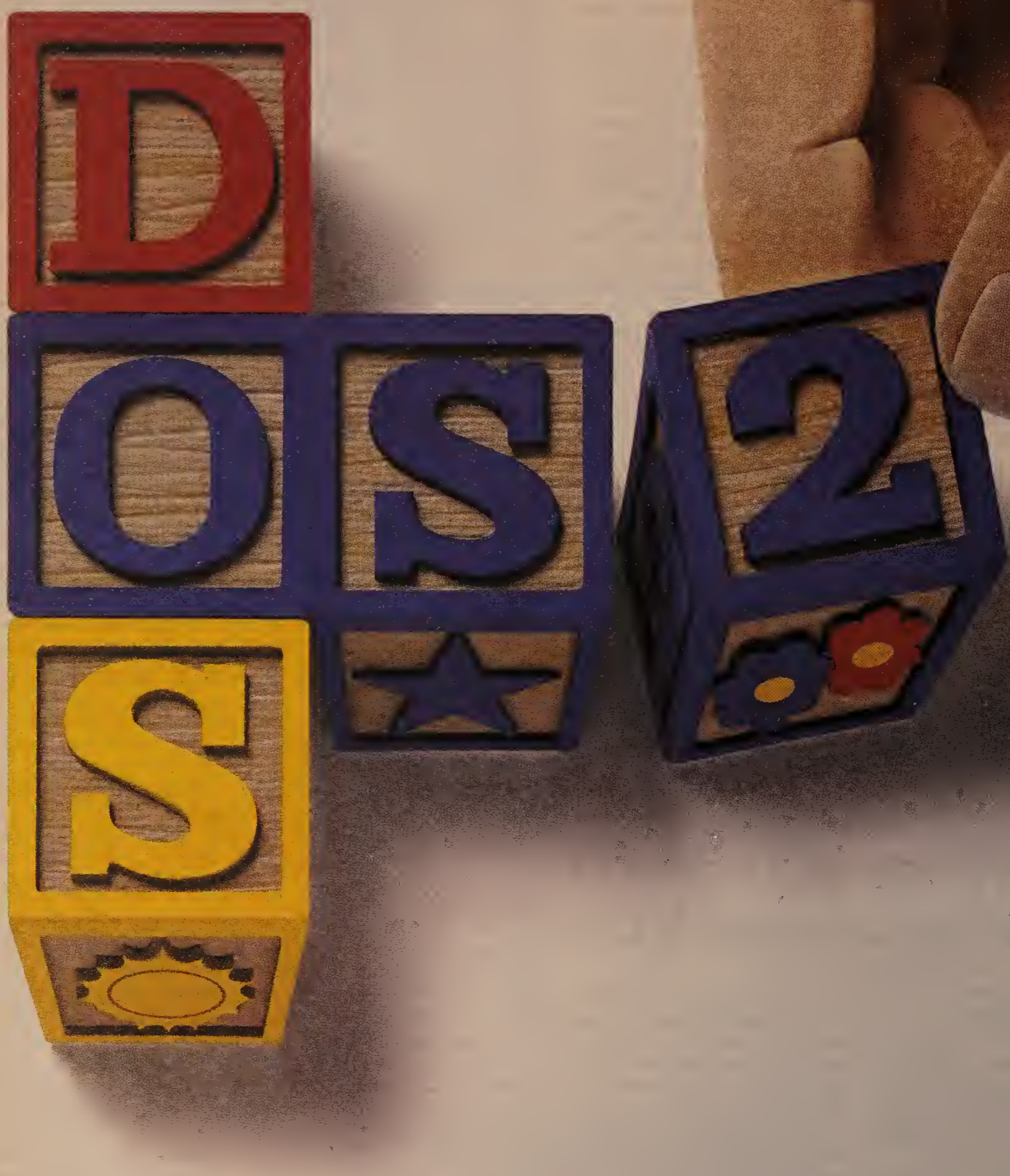
Without a two-phase commit protocol, users who try to change data on multiple servers with a single command risk having changes made to only one data base if the network fails before changes to data residing on other servers can be made.

Distributing the data

Informix-Star enables Informix, a strong player in the Unix-based DBMS market, to compete against rivals Oracle Corp. and Relational Technology, Inc. (RTI) — which last week changed its name to Ingres Corp. — in the development of distributed data base technology, analysts said.

"This announcement brings Informix roughly on par with Oracle and RTI in terms of distributed technology," said Michael Braude, a vice-president with Gartner Group, Inc., a market re-

(continued on page 30)



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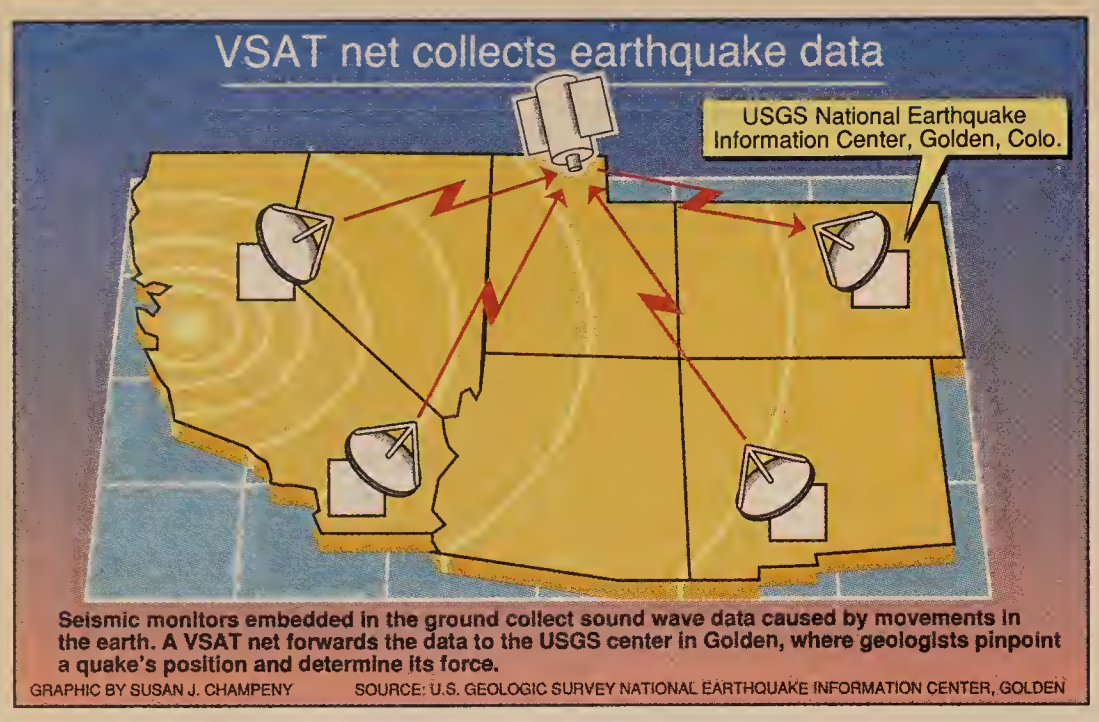

Seismic monitors embedded in the ground collect sound wave data caused by movements in the earth. A VSAT net forwards the data to the USGS center in Golden, where geologists pinpoint a quake's position and determine its force.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: U.S. GEOLOGIC SURVEY NATIONAL EARTHQUAKE INFORMATION CENTER, GOLDEN

VSAT net may help forecast earthquakes

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will be the first of its kind, Buland said.

The U.S. has a series of regional networks that detect movements in the earth but cannot record sound wave patterns that exceed a certain limit. Those regional networks consist of seismic monitors linked to a data center via terrestrial lines.

USNSN is designed to record those high-pitched sound wave patterns, which geologists find most helpful. Starting next spring, USGS will begin placing seismic sound wave monitors and microcomputers in 60 remote sites across the country.

The buried sensors collect analog sound waves traveling deep below the earth's surface. Data collected by the sensors is fed to an on-site, specialized microcomputer manufactured by Quanterra, Inc. of Shirley, Mass. The microcomputer runs software that detects when sound waves exceed acceptable limits and converts those waves into digital format.

VSATs, manufactured by Scientific-Atlanta, Inc., transmit the abnormal sound waves at 2,400 bit/sec to a master earth station hub located at USGS' National Earthquake Information Center, located here. The data is forwarded to a Simpact Associates, Inc. X.25 gateway attached to a DEC MicroVAX 3800. The gateway converts the data to MicroVAX format.

Using VSATs, the monthly satellite usage fee will average about $100,000. This compares to the nearly $1 million monthly charge to run dedicated terrestrial lines to each of the remote sites, Buland said.

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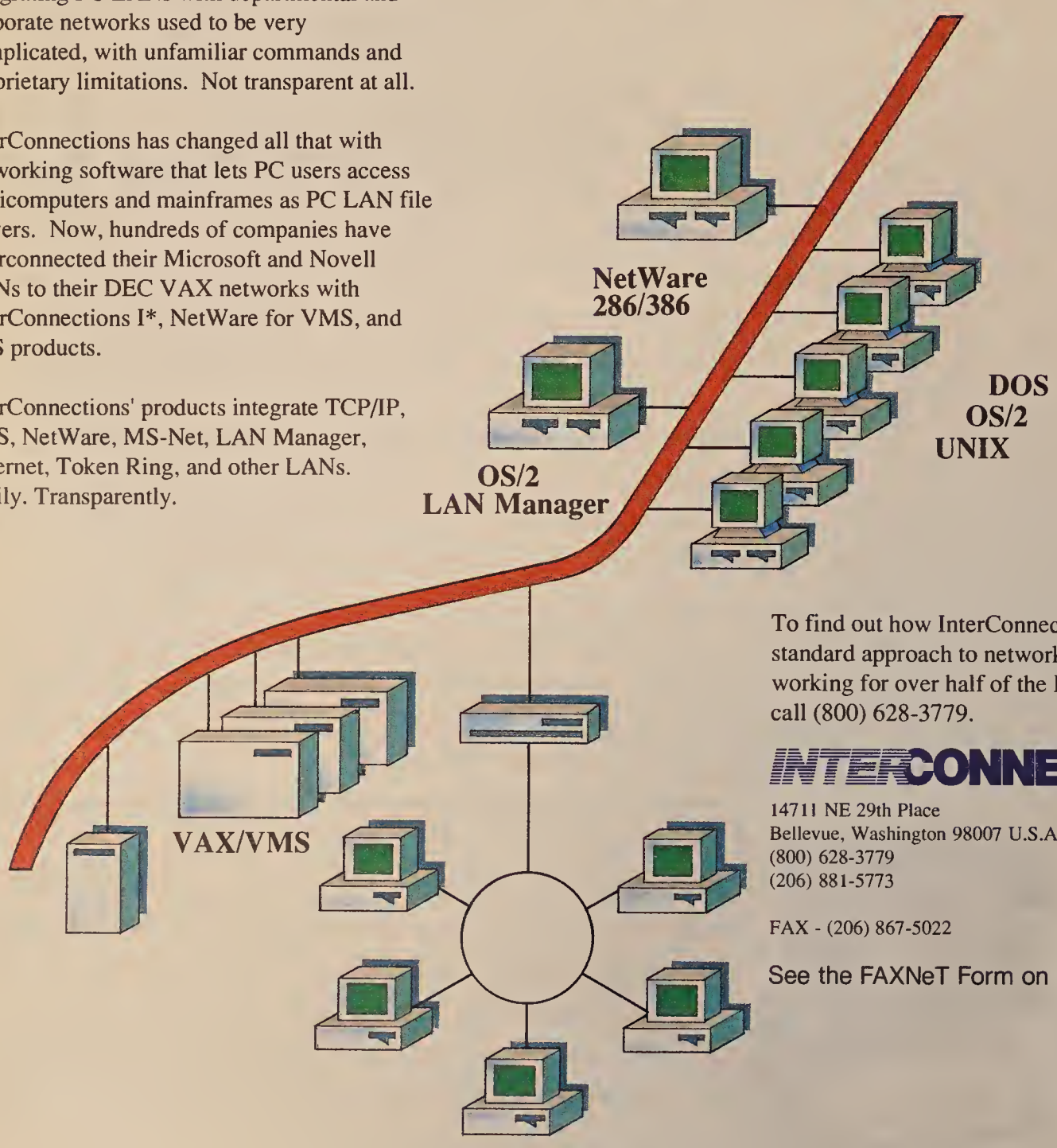

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DEC VAX to PC LAN Connectivity

Trucking co. satellite net offers edge

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need for truck drivers to phone dispatchers, which wastes driving time and costs the company $350,000 annually in toll-free 800 line charges, he said.

The mobile data net consists of a transceiver device and antenna mounted on each truck, plus a small data terminal in the truck's cab. Drivers key messages into the terminal, and data is transmitted via satellite from the truck to a Geostar earth station in Washington, D.C. From there, the data is sent via a separate very small aperture terminal link to BMC's main data center in Joplin, where the messages are parceled out to the appropriate regional subsidiary.

When dispatchers need to send a message to a driver, the process is reversed and incoming data is displayed on the terminal's screen, Russell said.

Position data is provided using the government's Loran-C network of radio transmitters, which is used to triangulate a truck's position. The data is collected by periodically polling the truck's transceiver via the satellite links.

The Joplin data center, like those operated by the three other BMC trucking units, is anchored by a System/38. The four sites are linked via 9.6K bit/sec lines, which will soon be upgraded to 19.2K bit/sec to handle the extra traffic the mobile data net is expected to create, Russell said.

BMC uses its System/38 net to support applications such as truckload planning, customer service, dispatching, accounting, billing, payroll, human resources and a new fuel network application scheduled to go on-line early next year.

With that application, BMC will be able to authorize charges to the credit cards its drivers use to buy fuel, pay for minor repairs or get cash advances at truck stops. By authorizing those transactions on its own network instead of relying on a third-party provider, BMC will save $15,000 per month, McKenna said.

The company also recently cut over MCI's Vnet service, which promises to save at least 15%, or $100,000, as compared to the calling cards, regular long-distance and 800 numbers BMC previously used to meet its voice communications needs, McKenna said.

The Vnet supports voice communications among dispatchers, load planners and customer service personnel at different locations when they need to hash out shipment details, McKenna said. It also supports links to regular long-distance and other switched services.

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See the FAXNeT Form on Page #91

Informix DBMS can tap multiple servers

continued from page 25

search group in Stamford, Conn.

Some analysts said that Informix-Star's ability to reduce network traffic when data from multiple servers is requested could even place Informix slightly ahead of Oracle.

The Informix-Star feature, called a cost-based optimizer, enables the server initially receiving a request to off-load processing to another server if the bulk of the data is stored on the other server.

How it works

For example, a server that initially receives a request to determine how many times each of five customers placed orders of $10,000 or more, will consult its directory of all data bases in the network. It may determine that the five customer records reside locally but that another server is managing thousands of order entry records for each of those customers.

To keep network traffic at a minimum, the five customer records are shuttled to the server managing the order entry records. That server sifts through the order records looking for orders that exceed $10,000.

The server will match the customer account number in the order entry record with the customer account number in the customer record to extract only the requested data, which is merged into a file and downloaded to the end user (see graphic, page 25).

Without a cost-based optimizer feature, the whole order entry record file would have to be shuttled to the server managing the customer records, because that is the server that initiated the process. And that process eats up valuable network bandwidth.

Leg up on Oracle?

Oracle uses this latter approach in its Oracle SQL-Star distributed data base architecture. "Oracle's [distributed] query capabilities aren't really usable" because they do not support optimization, Finkelstein said.

Oracle, however, downplays its lack of query optimization. "If you own an Ethernet or a token ring, you have plenty of bandwidth" to support the movement of extremely large files among servers, said Eugene Shklar, director of marketing for Oracle's Network Products Division. "In fact, you'd be hard-pressed to find anyone in the world who has an Ethernet or token ring that has been saturated."

Informix-OnLine will be distributed free to Informix-Turbo customers that have maintenance contracts with Informix.

Informix-OnLine for IBM Personal Computers ranges from $1,600. to $10,000.

For minicomputers, pricing ranges from $19,400 to $110,000, while the mainframe versions range from $38,500 to $166,000.

Users can add the Informix-Star option by paying an additional 25% above the cost for the Informix-OnLine package.

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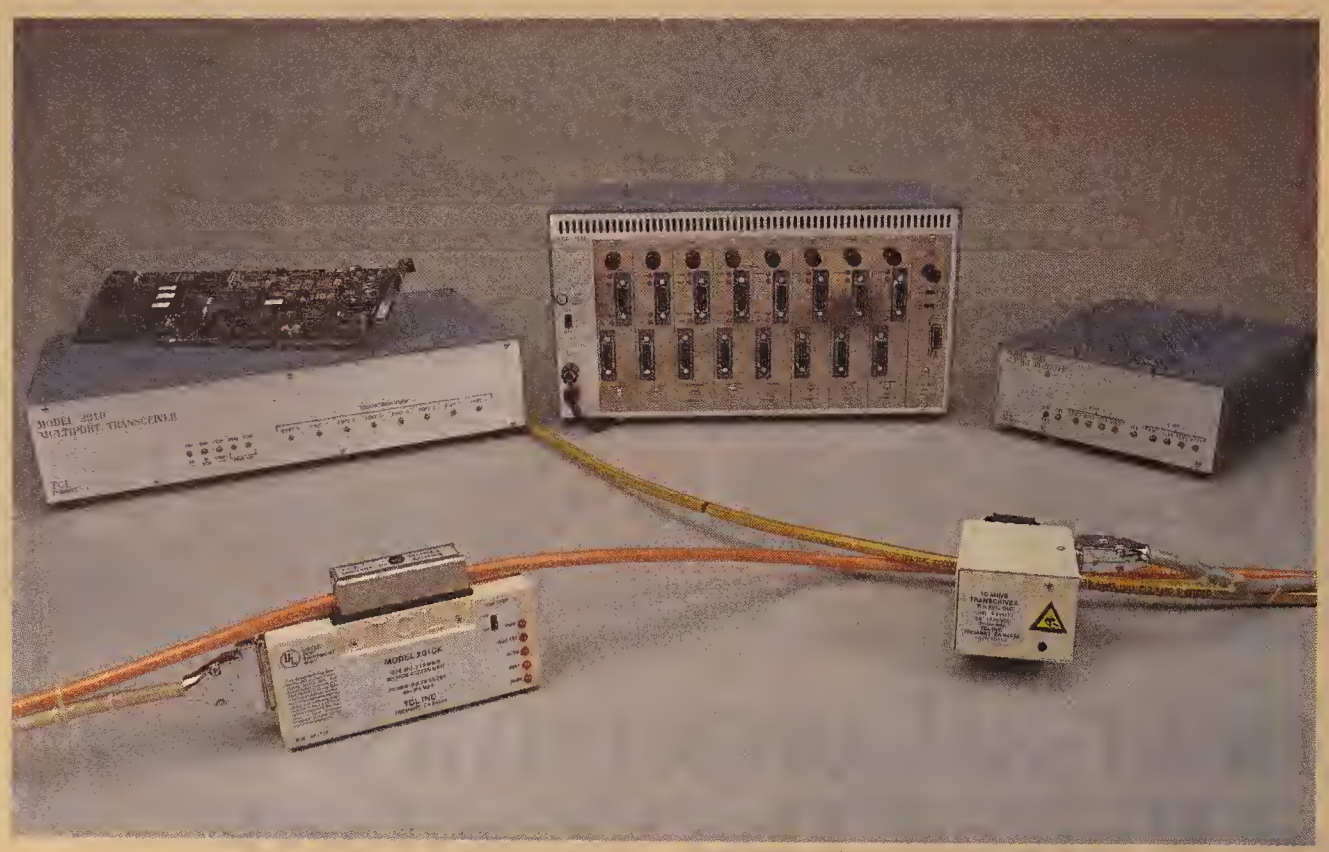

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Informix adds disk mirroring to its DBMS

MENLO PARK, Calif. — The addition of distributed data base functionality was only one improvement Informix Software, Inc. made to its Unix-based data base management system.

The company also added a disk-mirroring capability to its Informix-OnLine DBMS, which is an improved version of the Informix-Turbo DBMS.

Disk mirroring enables the DBMS software to automatically store duplicate copies of data on two different disk drives. One of the disk drives operates in background mode to create a mirror image of data written to the primary disk drive.

The backup drive can take over when the primary fails, thus reducing the chance that data base queries will be interrupted when a disk fails.

Informix-OnLine also lets users create a field in a data base record that supports a data object, which represents a word processing document, graph, spreadsheet, facsimile document, video image or digitized voice file of up to 2G bytes in length. A data object is a symbol used to represent a much larger string of data.

Users wishing to access the data file the data object represents use the data object symbol in an SQL command issued from within an Informix data base application. That SQL command instructs the Informix-OnLine DBMS to retrieve the data that matches the data object symbol.

In some cases, users will need additional hardware and software to store, retrieve and display these large strings of data. For example, in addition to the Informix data base application, users will need graphical user interface software capable of displaying a stored image on screen or a piece of hardware capable of playing back a stored voice file.

Due to the size of the files represented by data object symbols, users may also need high-capacity disk storage devices, such as an optical disk drive.

Informix-OnLine will be distributed free to Informix-Turbo customers that have maintenance contracts with Informix.

— Jim Brown

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

Half of the 50 Fortune 1,000 customers of Novell, Inc. surveyed recently said they don't plan to buy NetWare 386. One reason: the product's $8,000 price tag, which many potential users say is too high, according to a report by Forrester Research, Inc. in Cambridge, Mass.

Netnotes

Novell, Inc. and **Apple Computer, Inc.** recently agreed to support a common programming interface that lets developers write applications that work with Novell's and Apple's Transmission Control Protocol/Internet Protocol drivers.

This means a developer can write a TCP/IP application without regard to whether the application will run in a Novell or Apple environment. Protocol drivers, such as MacTCP and TCPort, are used to format data for transmission across a network.

Under terms of the agreement, Novell will include Apple's MacTCP as part of the TCPort Developers' Toolkit currently sold by Novell subsidiary Excelan, Inc., which specializes in TCP/IP software.

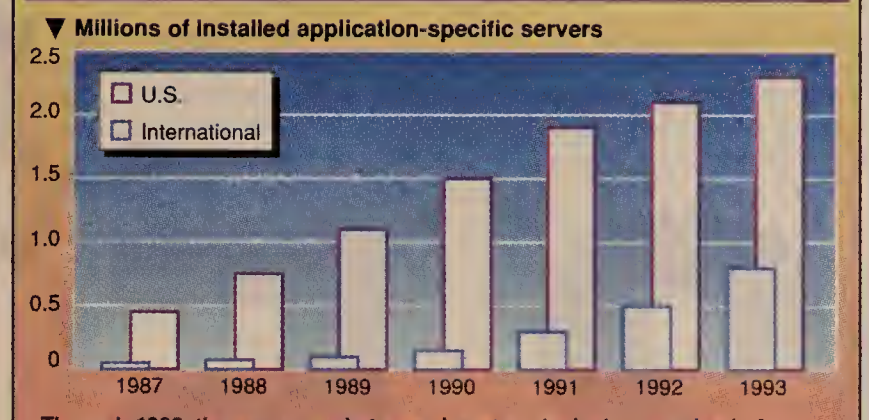
That gives application developers a programming interface that makes common procedure calls to either Apple or Novell TCP/IP drivers, according to Steven Nelson, Novell director of product marketing in charge of the company's Apple product line.

Prior to this, application developers were faced with writing applications for either the Novell TCPort driver for the Macintosh or Apple's MacTCP.

"The availability of a common programming interface means that users will see many more TCP/IP applications developed for the Macintosh within the next year," Nelson said. "Until now, we've

(continued on page 34)

Application-specific servers gain acceptance



Through 1988, the server market was almost exclusively comprised of dedicated file servers. However, there is growing use of application-specific or custom-designed servers such as data base servers and facsimile servers.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

User leases conduit space from telco to extend LAN

Provides link to workstations in nearby building.

By Tom Smith
New Products Editor

PHILADELPHIA — A value-added reseller recently helped a user minimize the cost of connecting workstations to a server in a neighboring building by snaking fiber cable through an unused telephone company conduit.

The client, United Engineers & Constructors, Inc., based here, spent roughly $1,000 to lay the cable and lease the conduit for the first two years. That's significantly less than utilizing bypass carrier services that would have cost roughly $15,000 for the same period.

> "We put jeans on one day, went down into the basement and found there was already conduit running between the two buildings."
>
> ▲▲▲

JVC Technologies, Inc., the reseller based in nearby Wayne, Pa., made use of a tariff that permits users to lease conduit space from local phone companies. Under a Pennsylvania Public Utility Commission (PUC) mandate, Bell Telephone Co. of Pennsylvania rents unused conduit space to users at a rate of $5.45 per foot per year.

Modems don't cut it

United Engineers first identified the need to connect its workstations to the Ethernet network in February, according to Howard Campbell, contracts and administration manager for the architectural and engineering firm, a subsidiary of Raytheon Co. headquartered in Lexington, Mass.

The firm had recently occupied space in a building across the street from its headquarters and needed to connect the workstations to the Ethernet, which runs Novell, Inc.'s SFT NetWare Version 2.15 operating system.

The Ethernet server maintained information that users in the other building needed to access.

A pair of 9.6K bit/sec modems were initially used to provide the connection, but those were eventually replaced by 19.2K bit/sec modems.

At both speeds, users experienced significant delays because the modems could not support the required throughput. The firm then issued a request for proposal to upgrade communications between the neighboring buildings.

"We could not get the network to function in a manner that would satisfy users," Campbell said. "The main problem was that the modems were too slow. Users were always waiting."

Long shot in the cellar

JVC Technologies sought a more cost-effective solution. "We put jeans on one day, went down into the basement and found there was already conduit running between the two buildings," said John Cellini, a principal at JVC Technologies, which worked with property management personnel for the two buildings to obtain the necessary information about their wiring room layouts.

Cellini contacted Bell Telephone to find out if the conduit could be used by United Engineers. "It was a long shot to

(continued on page 34)

EISA-based network adapters on the way

New 32-bit boards for EISA bus architecture appear for Ethernet, token-ring and Arcnet nets.

By Susan Breidenbach
West Coast Bureau Chief

HOUSTON — Compaq Computer Corp.'s first Extended Industry Standard Architecture (EISA) servers started rolling off the assembly lines last week, and 32-bit adapters needed to link them to the three major network topologies — Ethernet, token-ring and Arcnet — aren't far behind.

When Compaq unveiled its new SystemPro machines here on Nov. 6, several manufacturers of network interface adapters were on hand to show off their wares based on the EISA bus architecture. Some of the boards are already available, and the rest have been promised by year end. Meanwhile, existing — albeit slower — EISA boards will work with the systems.

Fiber-optic specialist Codenoll Technology Corp. said it is already shipping its first two EISA products — a fiber-optic Ethernet adapter and a Fiber Distributed Data Interface (FDDI) board. Both are 32-bit cards that take advantage of the EISA bus master technology, producing throughput of up to 33 MHz. The Ethernet and FDDI adapters, priced at $995 and $5,495, respectively, are available with drivers for Novell, Inc.'s NetWare, Microsoft Corp.'s LAN Manager and The Santa Cruz Operation, Inc.'s Unix.

The Codenoll adapters and other soon to be released EISA boards all incorporate Intel Corp.'s BusMaster Interface Chip (BMIC). The BMIC enables them to move data at high speeds directly between their buffers and a host system's central processor.

Local-area network industry leader Novell announced a 32-bit EISA Ethernet interface that is scheduled for release this quarter. Developed jointly with Compaq, the NE3200 has drivers optimized for the NetWare 386 environment. It includes 48K bytes of on-board memory, supports both thick and thin coaxial

(continued on page 33)

User gives mixed marks to new Access/One tools

By Tom Smith
New Products Editor

REDMOND, Wash. — Microsoft Corp. gave mixed reviews to two Ungermann-Bass, Inc. products unveiled in a recent barrage of enhancements to the company's Access/One local-area network product line.

Microsoft, a major user of Access/One, has already purchased 18 Access/One Ethernet-to-Fiber Distributed Data Interface (FDDI) SuperLAN bridges. The company is also currently testing MaxTalk, an Apple Computer, Inc. LocalTalk interface that can connect up to 16 LocalTalk devices or LocalTalk networks to an Ethernet backbone ("UB launches its Access/One additions to enhance line," *NW,* Oct. 23).

MaxTalk supports both AppleTalk and Internet Protocol, eliminating the need for Ethernet workstation adapters.

Dave Leinweber, manager of LAN administration for Microsoft, based here, said the MaxTalk product could provide performance and manageability improvements compared to the networking products the company is currently using. While he said the FDDI bridges have exhibited "phenomenal" reliability, Leinweber expressed concern about the performance of the SuperLAN Ethernet-to-FDDI link.

The Access/One system is a cabinet with either five or 11 slots for interface modules supporting a variety of end-user devices, such as personal computers, asynchronous and 3270 terminals as well as Ethernet and token-ring networks. Devices are supported over a variety of media: shielded and unshielded twisted-pair wiring, fiber-optic and coaxial cable.

Microsoft has more than 60 11-slot Access/One cabinets, Ungermann-Bass LAN interface cards in 6,000 personal computers worldwide and Access/One interfaces supporting another 2,500 asynchronous terminals. The company has an FDDI backbone network connecting Access/One nets in its 12-building campus.

Two MaxTalk cards — one in a test bed and the other in a live

(continued on page 34)

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EISA-based network adapters on the way

continued from page 31

connectors and is priced at $1,295.

Torus Network Products, Ltd. of Cambridge, Mass., also announced a 32-bit EISA Ethernet adapter for both thick and thin coaxial media. The Torus board has 64K bytes of dual-ported, static random-access memory and supports NetWare, LAN Manager (including Torus' own Tapestry II, a version of LAN Manager) and MS-Net derivatives. The board comes with a two-year warranty; the price has not yet been set.

At the Compaq event, there were no EISA Ethernet adapters supporting unshielded twisted-pair media. However, they are expected to appear shortly.

Gary Stimac, Compaq's vice-president of systems engineering, said he is also aware of an Ethernet vendor working on an EISA adapter that has two separate Ethernet interfaces on it, which would let you hook a single Ethernet subnet to one network interface board, thus preserving an expansion slot. The combination of the larger size of the 32-bit boards and the increasing integration of the board components is leaving unused "real estate" on the EISA boards, making multiple-interface server boards feasible, Stimac said.

Computone Products, Inc. of Roswell, Ga., took advantage of this available real estate by building an EISA communications subsystem that can incorporate an Ethernet controller and three other communications modules: a fascimile module that supports Group III fax machines and most scanners; an asynchronous module for communications with terminals and other serial devices; and an asynchronous/synchronous module for connecting to minicomputers and mainframes.

Proteon, Inc. in Houston demonstrated a 32-bit EISA version of its ProNet 4/16 token-ring adapter, which operates at software-selectable speeds of 4M or 16M bit/sec, and has a 128K-byte buffer.

Available in limited quantities by the end of the year, the Proteon adapter is priced at $995 and supports both unshielded and shielded twisted-pair cable. The Compaq event was the first time Proteon publicly exhibited 16M bit/sec token-ring running across unshielded twisted pair.

Madge Networks, Inc. also unveiled an EISA-compatible 16/4 token-ring adapter (see "Madge unveils adapter for EISA servers," this page).

Compaq's EISA servers will be supported on Arcnet networks by Standard Microsystems Corp.'s (SMC) EISA3200. The 32-bit adapter incorporates four separate Arcnet controllers so each board can support Arcnet subnetworks. Alternatively, all four channels can be used to create a higher speed backbone between two Arcnet servers. With the 42.5M bit/sec interfaces operating concurrently between the two systems, the link has an effective throughput of 10M bit/sec.

The SMC EISA3200 is available with either coaxial or unshielded twisted-pair connectors and comes with drivers for NetWare 2.15 and NetWare 386; the price of the adapter is set at $995.

Madge unveils adapter for EISA servers

SAN JOSE, Calif. — Madge Networks, Inc. last week introduced a 16M/4M bit/sec token-ring adapter designed for both Extended Industry Standard Architecture (EISA) and Micro Channel-based servers.

The company says its Smart 16/4 EISA Ringnode can achieve data transfer rates of up to 33 MHz — roughly 33M byte/sec — the maximum speed of the EISA bus. The adapter features 128K bytes of on-board random-access memory and runs on any EISA-based file server, including Compaq Computer Corp.'s new SystemPro.

The Smart 16/4 EISA Ringnode exploits the bus master capabilities of EISA and Micro Channel computers to achieve high performance. According to Madge Networks, the adapter also utilizes the firm's new Smart Server software, which executes net operating system protocols on the adapter's dedicated communications processor. On most other token-ring adapters, protocol software resides on the CPU.

The CPU can download protocols, such as Network Basic I/O System or Novell, Inc.'s Integrated Packet Exchange/Sequenced Packet Exchange, directly to the RAM on the adapter.

(Proteon, Inc. President Patrick Courtin said that while he is unfamiliar with Madge Networks' Smart Server technology, his firm's adapters, priced $500 less than Madge Networks' product, will also be able to consistently achieve the full 33-MHz transfer rate of the EISA bus.)

The Smart 16/4 EISA Ringnode can be used with Novell's NetWare, IBM's PC LAN and LAN Server, and OS/2 LAN Manager network operating systems. It is fully interoperable with IBM Token-Ring adapters and supports direct connection to IBM 3174s and Application System/400s. It can also perform 3270 terminal emulation.

The Smart 16/4 EISA Ringnode is priced at $1,495 and includes network drivers, installation utilities and network diagnostics. It will ship in the second quarter of 1990.

— Laura DiDio

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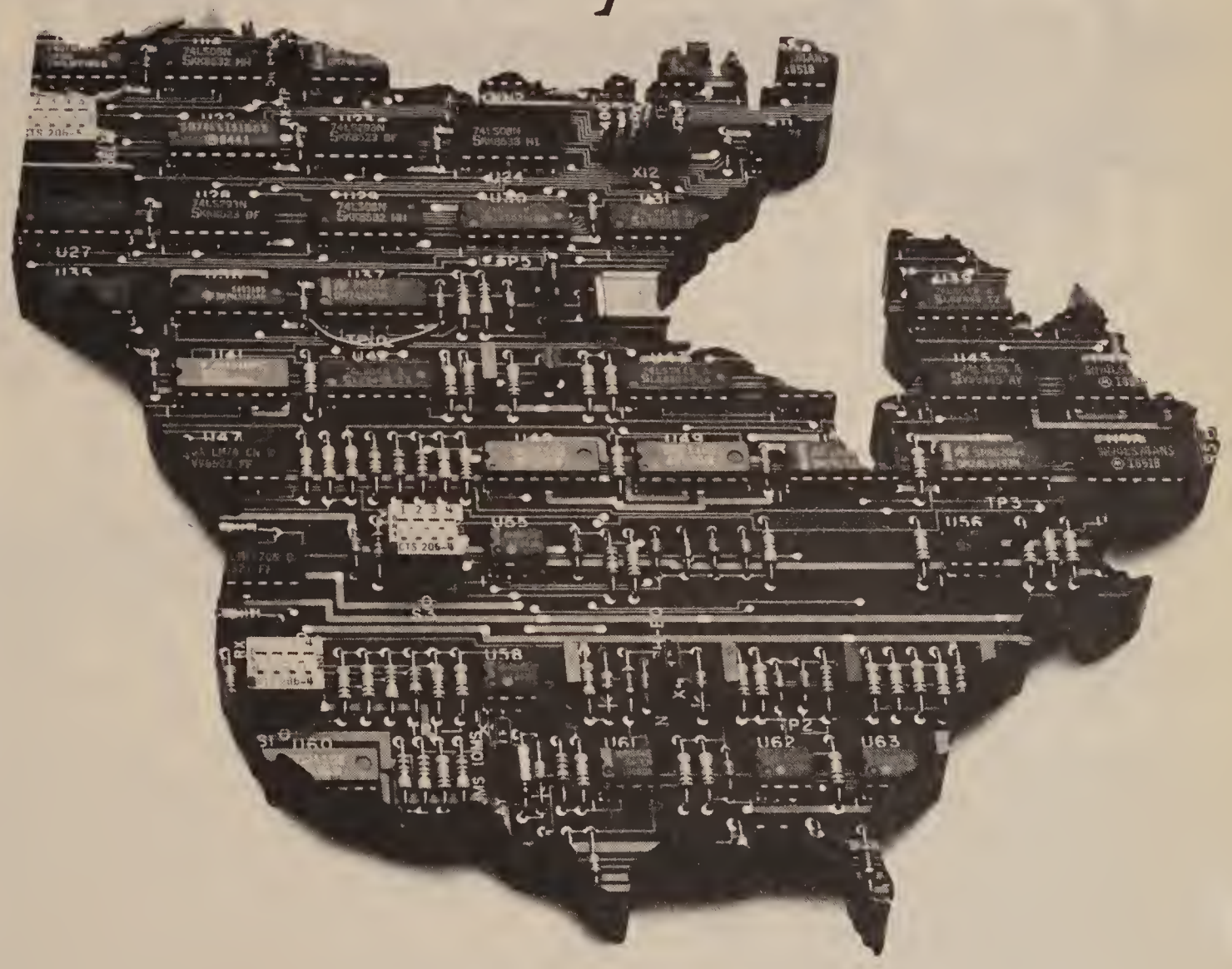

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Netnotes

continued from page 31

had a situation where developers have delayed writing TCP/IP network applications for the Macintosh environment while they waited for a common interface to emerge."

The next release of the Novell-Excelan TCPort Developers' Toolkit, which incorporates both the TCPort and MacTCP drivers, will ship in January. Site licenses begin at $2,500.

Ultra Network Technologies, Inc. of San Jose, Calif., and **cisco Systems, Inc.** of Menlo Park, Calif., said recently that they are joining forces to develop a high-performance interface between cisco's new AGS+ internetwork router and Ultra's gigabit/sec UltraNet network.

The interface, which will be marketed jointly by the two companies, will plug into the AGS+, a dual-bus router that supports 100M bit/sec Fiber Distributed Data Interface (FDDI) channel speeds, and will provide a link to an UltraNet 1000 or UltraNet 250 hub.

The interface will give access to UltraNet networks to users on FDDI or Ethernet networks running Transmission Control Protocol/Internet Protocol or Open System Interconnection protocols.

Pricing and a scheduled release date have not been announced. For more information, contact Ultra Network Technologies, 101 Daggett Drive, San Jose, Calif. 95134; (408) 922-0100. Or call cisco Systems, 1350 Willow Road, Menlo Park, Calif. 94025; (415) 326-1941.

User gives mixed marks to new tools

continued from page 31

network — are being tested, Leinweber explained. MaxTalk, which could potentially replace AppleTalk networks, would cut response time and offer faster file and print sharing than current products, Leinweber said. Unlike conventional AppleTalk networks, which divide a 230K bit/sec channel among multiple devices, MaxTalk gives each workstation a full 230K bit/sec channel to transmit data.

"We will consider moving to MaxTalk for the performance and simplified wiring management," Leinweber said. Microsoft expects to make a decision on whether to purchase the MaxTalk product in the coming weeks. "I suspect we'll end up buying a few and implementing them on a limited basis," he said.

The company now uses 65 sets of Kinetics, Inc. FastPath 4 AppleTalk-to-Ethernet bridges, along with the Farallon Computing, Inc. Star Controller unshielded twisted-pair wiring system, for AppleTalk nets.

Microsoft has had the Ethernet-to-FDDI bridges in operation since June, Leinweber said. They are being used in place of Ungermann-Bass Ethernet-to-Ethernet Data Link bridges, which have been retained for redundancy; if the FDDI bridges fail, the older bridges will be activated to transmit data. Although the performance of the FDDI bridges is "adequate," he said they are "not at a performance level we want to stay at for a long period of time."

Leinweber's concern is about the number of packets per second that are being transmitted. Most users would be satisfied with a transmission rate of 6,000 packet/sec, he said; Microsoft is currently peaking in the range of 4,000 to 4,500 packet/sec.

"I want the bridge to be fast enough so that no matter what is happening, it's able to pass data to the FDDI backbone at full speed. Right now, it's possible to flood a bridge on a very busy Ethernet," he said.

The bridges' incompatibility with other vendors' FDDI products is not currently regarded as a drawback, Leinweber said, because the FDDI standard is not fully defined. However, it could be a drawback in the future, he said.

The bridges' station management capability is proprietary at this time, but Leinweber did not fault Ungermann-Bass because the management functions were implemented under an evolving FDDI standard. "But I see it as a drawback on this product at this time." Station management is an evolving network management specification within FDDI standard.

Although the bridges have performed at the level he expected, Leinweber said he hopes for higher performance. "The bridges are fully functional; they are a critical portion of our LAN and will remain so," he said. "But I'm not willing to rest on that. I'd like to see faster bridges."

User leases conduit space from telco

continued from page 31

say the least," he said.

Given the 60-ft. distance of conduit running between the buildings, the total rental cost for the conduit space was only $327 per year. The Novell value-added reseller said it charged the user roughly $400 for the installation and consulting services it provided.

SynOptics joins the installation

JVC Technologies, along with a SynOptics Communications, Inc. value-added reseller, installed the six-strand fiber cable. Two strands are dedicated to sending and receiving data, two are for redundancy and the other two provide an upgrade path, Cellini said.

The cable links two SynOptics 1010 Department Concentrators, to which workstations are connected by unshielded twisted-pair wiring.

The fiber connection also provides users with access to the company's IBM 4381 mainframe, which is used primarily for its high-speed printing capabilities.

Campbell said the performance advantage offered by the fiber has been dramatic. "It's worked great," he said. "It's like being on-line; you don't even realize you're across the street."

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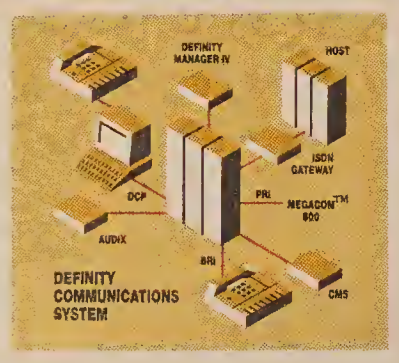

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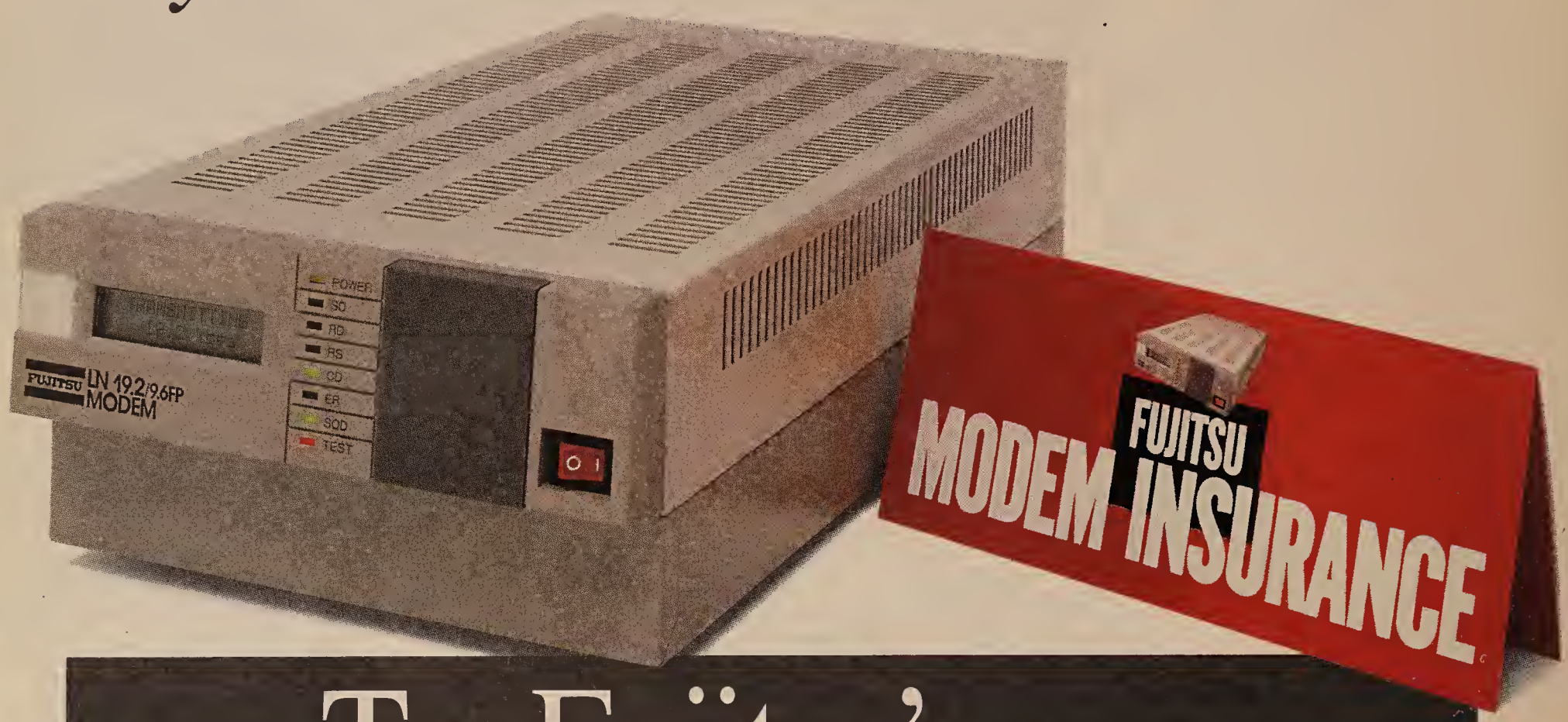

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FUJITSU

Dialogue

What effect do you believe the emergence of Synchronous Optical Network (SONET)-based services will have on user networks?

"SONET will be a catalyst for a whole new family of network services and premises-based hardware that could change the way companies buy and use networks. For example, SONET will make it possible for carriers to offer enhanced maintenance services that will minimize the amount of net management and performance monitoring users have to do.

SONET-based equipment will be available to carriers between 1990 and 1991, which means SONET will begin making an impact on user networks sometime between 1992 and 1993."

Gus Bender
Second vice-president
Telecommunications Division
The Travelers Corp.
Hartford, Conn.

"In the 1970s, if [people] said they had a high-speed data network, they probably meant dedicated 4.8K or 9.6K lines. If you ask [them] now, they probably mean T-1. I think [SONET is] the next natural extension in the evolution of high-speed data nets. Businesses will likely use SONET for channel-attached [wide-area] nets of [such things as] mainframes, disk drives, high-speed printers, remote tape drives and terminals.

Frederick Matteson
Vice-president and
director of
communications services
Nomura Computer Systems
America, Inc.
New York

"SONET will be totally useless unless the local exchange carriers or other providers of high-speed, high-bandwidth circuits lay fiber right to customer premises. At the rate the Bell operating companies are putting in fiber to customer premises, I don't see SONET going anywhere yet for small businesses. However, the BOCs are attempting to put fiber in industrial parks. [Much of] this may be done over the next couple of years. [Once this happens] large users [in industrial parks] might start requesting access to fiber links using SONET.

Chuck Papageorgiou
Telecommunications
staff member
A Fortune 100 transportation
firm based in the Northeast

States embracing backbone nets for savings, simplicity

Networks reduce costs, merge redundant facilities.

By Wayne Eckerson
Staff Writer

SYRACUSE, N.Y. — A new study shows that a majority of state governments surveyed are building digital backbone networks to reduce voice communications costs and consolidate a plethora of overlapping data networks.

Moreover, the drive to reduce costs and streamline communications is fostering greater coordination between state data processing and communications groups, according to the 300-page study, which surveyed information systems managers and other public officials from 23 states.

> States are being driven to build backbone nets to curb ballooning costs of basic service.
>
> ▲▲▲

The survey, "Managing Information Resources: New Directions in State Government," was conducted by the School of Information Studies at Syracuse University here with help from the National Association for State Information Systems, Inc. in Lexington, Ky., an association of state officials that oversees the use of information technology in the 50 states.

The study was designed to spotlight trends in the way states manage information resources, such as DP, telecommunications, records management and office systems.

Connectivity grows

Donald Marchand, a coauthor of the study and dean of the School of Information Studies, said states are being driven to build backbone networks to curb ballooning costs of providing basic telephone service to state employees and to avoid future rate hikes.

Of those states surveyed, seven have already installed statewide digital backbones, 12 are building such networks and three are considering doing so (see graphic, page 40).

States are primarily implementing statewide backbones to gain better control over voice services, not data, Marchand said.

(continued on page 40)

GUIDELINES

BY ERIC SCHMALL

Managers should steer clear of directory duties

Big troubles often come in innocent-looking packages. Telephone directories are a perfect example. So much information is getting added to these books that they have become an administrative boondoggle. Directories are getting so complex that communications departments are better off giving the responsibility for preparing them to someone else.

Not that network departments can avoid involvement in publishing phone directories; only communications departments can supply the up-to-date telephone numbers that form the backbone of those documents. But the task of integrating telephone numbers with the wealth of other information now contained in directories is so complex that communications departments are best advised to steer clear.

For instance, how is a network department supposed to be able to keep track of all the promotions within an organization? Yet organizational telephone directories are increasingly asked to provide such information. Many companies also want their directories to arrange employees by department and show who reports to whom. With the current rapid spate of mergers, acquisitions and reorganizations, how can a network department be expected to get this right?

(continued on page 40)

Schmall is network systems manager for an insurance holding company.

MANAGEMENT PROFILE

▲▲▲

BY BARTON CROCKETT

NCSA executives Frederick Matteson (left) and Joseph Jagentefl.

Nomura seeks profit from net expertise

NEW YORK — If you're looking to become a network services vendor, it helps to be recognized as a premier network user.

At least that's what top information systems (IS) executives at Tokyo-based Nomura Research Institute, Ltd. (NRI) are hoping, after the company was selected as the top user of information technology in the brokerage industry.

NRI was honored at a major conference on IS in the brokerage industry held this past spring by the Boston-based consultancy Arthur D. Little, Inc. Respondents to a survey of the more than 150 attendees at the event named NRI the firm "most likely to be a leader in global trading technology over the next five years."

According to Arthur D. Little, most of the attendees surveyed were senior IS executives at major financial services firms.

Joseph Jagentenfl, corporate vice-president of Nomura Computer Systems America, Inc. (NCSA), Nomura's U.S. IS subsidiary, based here, said he believes that recognition could be a big boost to the firm's effort to become a global net vendor.

NCSA, founded in 1986, provides computing and communications services for NRI's U.S. brokerage operations. Recently, the company began marketing services such as disaster recovery hot site facilities, facilities management of user networks and data centers, as well as international value-added network and consulting services.

Following footsteps

In pursuing its goal of profitability, Jagentenfl said NCSA is following in the footsteps of its big brother, Tokyo-based Nomura Computing Center Co., Ltd. Founded in 1966 to provide computing services to NRI, which was founded the previous year, Nomura Computing Center now pulls in more revenue from sales to outside firms than from internal billings, Jagentenfl said.

Among other activities, Nomura Computing Center runs point-of-sale networks supporting hundreds of Japanese retailers and gasoline stations.

The company also handles data processing chores for more than 30 brokerage firms around the world.

"We want to be just as successful as they are, and maybe [even] do better," Jagentenfl said.

Meeting the challenge

Getting to that point will be a real challenge. NCSA currently collects minimal revenue from outside sales — mostly consulting fees from advising other Japanese brokerage firms about their U.S. technology operations.

Since its formation, NCSA has focused most of its energies on building a new data center and communications infrastructure for Nomura's U.S. brokerage operations. The main hub for this computer/communications setup was completed at the end of 1986 — a state-of-the-art, earthquake-protected data center on Staten Island. Inside this data center are two IBM 3090 mainframes linked to Nomura's lower Manhattan headquarters by eight fiber-optic T-1 lines leased from an alternative access carrier, Teleport Communications Group, based here.

These T-1s carry data traffic supporting the bulk of Nomura's

(continued on page 41)

States embracing backbone networks

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The backbone networks enable states to consolidate their voice traffic, which gives them better economies of scale and minimizes the impact of rate hikes, Marchand said.

"Most states now consider voice a central utility that the state establishes and all agencies must use," he said.

But the backbone nets are also providing states with a convenient way to consolidate a hodgepodge of data networks. Many states are using or planning to use the backbone to eliminate overlapping leased lines that state agencies have implemented to link remote offices together. Many of these lines run between the same geographical areas and can be easily moved onto a backbone, Marchand said.

Massachusetts, for example, is preparing to build a T-1 backbone network that will consolidate traffic from 10 data networks and eliminate hundreds of overlapping leased lines (see "Mass. gov't combines data and voice nets to cut costs," *NW,* Oct. 16).

The state of backbone nets

States weighing plans to build backbone networks:

Michigan
Vermont
Wyoming

States currently building backbone nets:

Arizona
California
Colorado
Connecticut
Delaware
Kentucky
Massachusetts
Minnesota
New Jersey
New York
Oklahoma
Utah

States already operating backbone nets:

Florida
Maryland
Montana
Oregon
South Carolina
Texas
Washington

Figures are based on a survey of 23 states.

SOURCE: SYRACUSE UNIVERSITY, SYRACUSE, N.Y.

Other states, such as Kentucky and South Carolina, are using backbone networks to meet a growing demand among community colleges and state universities to support video for educational purposes, Marchand said.

"While states have decided to build their backbones to support voice, most are now looking at opportunities for the net to carry other traffic as well," he said.

The study warned that states may have a difficult time linking the growing number of departmental local-area networks into statewide backbone nets.

Most have adopted a laissez-faire attitude toward departmental LANs, leaving it up to end users to provide the necessary technical support. Marchand said these states will have to build costly gateways or interfaces if they want to link the LANs to statewide networks.

A few states have issued policy statements saying they won't support LANs that are not compatible with predetermined network architectures or standards, Marchand said.

Turning over a new leaf

The growing convergence of voice and data services in states is also fostering greater communications between state DP and telecommunications departments. Prior to deregulation, these staffs worked in relative isolation. But the growth of private networks since deregulation has made the activities and functions of these groups increasingly interrelated, the study said.

"We were impressed by the increasing level of coordination among voice and data staffs," Marchand said.

The benefits of closer cooperation include better integration of diverse technologies and an increase in overall network performance, Marchand said.

Closer working relationships among voice and data staffs, however, does not mean states are merging the two groups at an organizational level, Marchand said. Most states support separate voice and data departments, and often house them in separate divisions, either general services or the office of administration.

According to the study, 35% of state telecommunications departments are housed under the general services division, and 22% are housed in administration, while 31% of DP groups are placed in administration and only 13% under general services.

While network managers need to foster close working relationships with DP managers, Marchand said their most most important task is to educate public officials about the importance of networks in delivering basic state services.

"Network managers must continue to raise the awareness of public officials that networks are critical to the efficient and effective operation of state governments," he said.

Managers steer clear of directory duties

continued from page 39

Errors found in an expanded, authoritative volume can cause quite a stir. For instance, rumors will probably fly if the telephone directory accidentally leaves out a corporate officer's title. People will ask, "Was the title dropped because of an administrative error, or did the communications department inadvertently publish the news early?" Laden with extra information, telephone directories are evolving into a rich, corporate data base. Yet, precisely because these documents are becoming so important, communications managers must free themselves from dealing with them. Leave the responsibility to human resources or personnel.

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Nomura seeks profit from net expertise

continued from page 39

U.S. trade recording, clearing and processing operations. Nearly 300 personal computers and engineering workstations, interconnected by multiple Ethernets at the Manhattan site, support trading analysis and real-time stock quotes.

NCSA maintains two 64K bit/sec and one 128K bit/sec satellite links from Staten Island to Tokyo, and two 64K bit/sec links on fiber-optic cable and satellite facilities from the U.S. data center to London. These international links carry multiplexed voice, trading data and Group IV facsimile traffic.

NCSA uses 56K bit/sec links to carry trading data between the main data center and Nomura's Chicago and Los Angeles offices. Other 19.2K bit/sec circuits carry information between Staten Island and Nomura's Montreal, Toronto and Honolulu sites. NCSA payrolls have grown from only a handful of people to about 100 over the past three years.

Jagentenfl declined to provide more detail about the applications Nomura Securities supports with its computer and communications infrastructure.

For NCSA's outside business opportunities, however, Jagentenfl was more expansive. NCSA owns a 25% stake in a newly constructed intelligent building near its Staten Island data center, which Jagentenfl said the firm hopes to equip with an IBM mainframe and lease to other users as a disaster recovery and software development site. Jagentenfl said talks are advancing on this front with three firms, which he declined to name.

He explained that in 1987, Nomura was licensed as a Japanese international value-added network (IVAN) carrier. Armed with this license, NCSA is close to striking its first IVAN services contract to link another brokerage firm's nets in London and the U.S. to Tokyo, Jagentenfl said.

Traffic would be carried over NCSA's existing network using X.25 protocols. Frederick Matteson, NCSA vice-president and director of communications services, added that Nomura also wants to carry international electronic mail traffic over the network.

Matteson said NCSA plans to increase the capacity of its international facilities as demand for the firm's IVAN services grows.

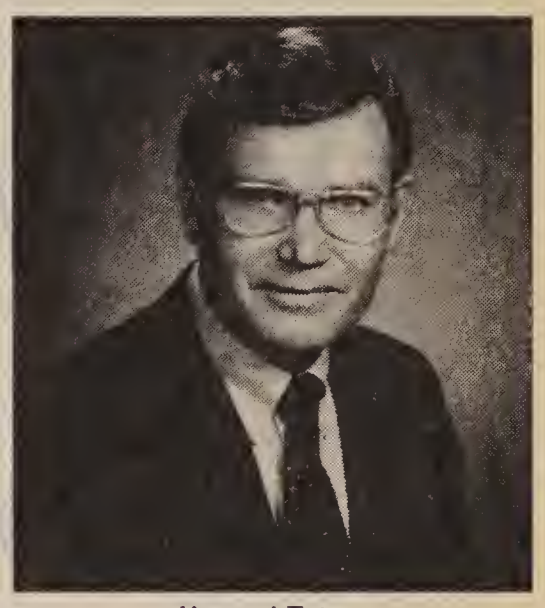
Successful LAN project leads to exec's departure

By Barton Crockett
Senior Editor

NEW YORK— After spearheading a local-area net implementation project that saved his employer millions, Howard Tatem has programmed himself out of a job.

Last month, Tatem, former vice-president of MIS at CBS-Fox Video, quit his post after successfully replacing the company's mainframe-based information processing system with IBM Token-Ring Networks linked by a Token-Ring backbone and supporting applications such as accounting.

Because the LANs are easier to maintain than the host-based systems, Tatem said CBS-Fox has been able to reduce its MIS



Howard Tatem

payroll by more than 90% and cut annual MIS expenditures from $6 million in 1986 to about $1 million for 1990 ("CBS-Fox Video abandons mainframe for local nets," *NW*, July 10).

Tatem said he left because the scaled-down MIS department was too small. "I had no interest in staying," Tatem said. "My background is heavy mainframe."

CBS-Fox Video's LAN initiative was brought about by the company's decision three years ago to sell its Livonia, Mich.-based videocassette manufacturing facility and focus on acquiring and distributing films. With fewer computing requirements, CBS-Fox looked for ways to re-architect its systems. A LAN solution was chosen because it allowed the company to move data processing activities from Livonia to its headquarters here, which did not have enough space for the data center needed to house a mainframe.

Tatem, who started with CBS-Fox Video in 1986, said he knew from the outset of the LAN project two years ago that the initiative would result in his leaving. He said he discussed his intentions with his superiors, who gave their approval early on.

"I got a very generous severance package, and we left on good terms," Tatem said. Tatem's superiors say they are delighted with the job their former MIS manager did. "He's the guy with the white hat who rode into town to clean everything up," said CBS-Fox Video's chief financial officer, William Barker Jr.

While CBS-Fox's business requirements were unique, Tatem said he believes other mainframe users could benefit by off-loading processing chores to LANs. "You may not reduce your staff like we did, but you can avoid any increases," Tatem said.

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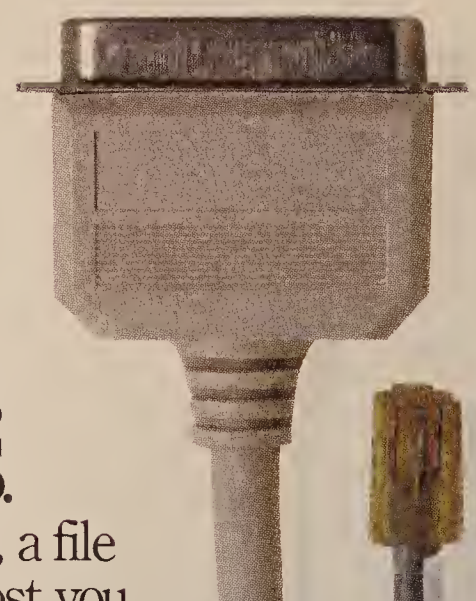

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- Security and audit software for the VAX.
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- Interface boards that link IBM PC ATs and PS/2s to an FDDI backbone.

First Look

Lantana to show off four interface cards

Lantana Technology, Inc. will introduce at Comdex/Fall 1989 four interface cards for token-ring local-area networks.

The **Cypress/2-16,** designed for IBM's Micro Channel Architecture on Personal System/2s, operates at 16M bit/sec. It is intended for file-server and graphics-intensive applications requiring rapid transmission of large amounts of data and will be available in the first quarter of 1990.

The **Cypress/3-16,** designed for the IBM Personal Computer AT, also operates at 16M bit/sec. It supports an early token release feature, which releases the token when a packet is transmitted, allowing the next station on the LAN to immediately access the net.

By contrast, other token-ring interfaces hold on to the token until transmission is complete and only then pass the token on to another device on the network. Configuration software on the Cypress/3-16 lets users switch from 4M to 16M bit/sec operation. Cypress/3-16 will be available in the second quarter of 1990.

The **Cypress/3-4,** an interface for the IBM Personal Computer AT, operates at 4M bit/sec. It will be available in the first quarter of 1990.

The **Cypress/1** is a half-length board that can be installed in an IBM Personal Computer XT. It is offered as a low-cost interface that is switch-selectable, capable of operating at 4M or 16M bit/sec.

All Cypress products include Novell, Inc. drivers for NetWare 2.X and 3.X.

(continued on page 44)

DEC board extends VAX 9000 reach

By Jim Brown
Senior Editor

BOSTON — Digital Equipment Corp. recently announced an interface that links its new VAX 9000 mainframe to a VAXcluster network.

The Computer Interconnect Interface for the VAX 9000 is compatible with the VAX 9000's XMI bus and links the mainframe to a VAXcluster Star Coupler via two coaxial cables. The interface enables the VAX 9000 to use both cables simultaneously to transmit to or receive data from couplers at up to 140M bit/sec. Previous VAXcluster interface boards used one cable to send data at 70M bit/sec and the other to receive data at 70M bit/sec.

The new board also features improved buffering capabilities that shuttle data from the VAX CPU to the VAXcluster at 8M byte/sec, a fourfold improvement over the 2M byte/sec rate of existing VAXcluster boards.

DEC also announced that its Star Couplers can now support 32 ports, an increase from 24. A VAXcluster can support up to five Star Couplers or as many as 160 VAXcluster connections.

The total number of devices a VAXcluster can support, however, is still 96. Devices can be attached to multiple Star Couplers. The ability to attach a single VAX to multiple couplers helps distribute the traffic load across a cluster. A VAXcluster enables applications running on up to 16 VAXes, including up to four of the new VAX 9000s, to communicate with each other and share access to such peripherals as disk drives and printers. VAXclusters appear as a single system to users and will automatically log users onto the VAX running the application desired by the user.

Each VAX 9000 supports up to 10 coupler interfaces, meaning a single VAX 9000 can be connected to multiple Star Couplers. The boards cost $35,000.

Microcom introduces first modem to support MNP 10

Modem adapts to low-quality line conditions.

By Tom Smith
New Products Editor

NORWOOD, Mass. — Microcom, Inc. last week introduced the first modem to employ Microcom Network Protocol (MNP) Class 10 for data transmission over low-quality connections, such as cellular or international links.

The QX/2400t is a V.22bis-compatible, full-duplex, dial-up modem that supports speeds up to 12K bit/sec by using MNP Class 7 to compress data. According to the company, the modem supports the highest throughput of any V.22bis modem on the market. In addition to MNP Classes 7 and 10, the modem also supports MNP Classes 1 to 5.

Target customers will be mobile cellular telephone users, news media personnel and public safety officials. A fire truck equipped with a terminal could download the floor plan of a building while it is en route to a fire, for example.

MNP Class 10 has three key components, collectively known as Adverse Channel Enhancements, that allow a modem to compensate for and improve the quality of dial-up telephone lines.

The first of these, Robust Auto Reliable, makes up to 12 attempts, without redialing, to establish a connection when there is interference on a line.

Aggressive Adaptive Packet Assembly, another component of MNP Class 10, adapts the size of data packets traveling over the synchronous link between the modems to accommodate varying levels of interference. When the line is of poor quality, the component will shrink the size of the packets so that they can be transmitted without errors.

MNP Class 10 uses Dynamic and Negotiated Shift Speeds to raise the speed and packet size as the line quality improves, assuring that the connection is made at the highest possible speed.

With these Adverse Channel Enhancements, users benefit from higher throughput, greater accuracy over poor transmission lines and a larger number of successful calls.

In addition to V.22bis, the QX/2400t supports Bell 212A and 103, as well as the Hayes Microcomputer Products, Inc. AT command set. It is switch-selectable, capable of operating in both synchronous and asynchronous modes.

The QX/2400t costs $699 and will be available 30 days after receipt of order.

Microcom can be reached by writing to 500 River Ridge Drive, Norwood, Mass. 02062, or by calling (617) 551-1000.

AT&T broadens data systems' net options

Company offers X/Windows support, bolsters connectivity of 3B minis and terminal subnets.

By Tom Smith
New Products Editor

MORRISTOWN, N.J. — AT&T's Data Systems Group recently unveiled products to bolster its support for X/Windows, enhance its minicomputer connectivity and link its terminal-based subnetworks into IBM Token-Ring Networks.

The new products include X/Windows emulation software for DOS-based personal computers, two new terminals, network enhancements to the 3B4000, a fiber expansion module for 3B2 minicomputers and the first-ever token-ring connectivity options for terminal-based subnets.

AT&T introduced PC Xsight Server Release 2.1, which enables Intel Corp. 80286- or 80386-based personal computers at remote sites to emulate X/Windows terminals in order to access applications on a host running Unix System V Release 3.2.1 and above. The host must also be running the AT&T XWIN Graphical Windowing System Release 1.1 or any compatible windowing system.

AT&T is reselling the product through an agreement with Locus Computing Corp., the Inglewood, Calif., developer of the software package.

PC Xsight Server Release 2.1 is expected to be available in December for $495.

Terminal enhancements

AT&T unveiled two terminals: the AT&T 730 Multitasking Terminal With Graphics (MTG), which is an upgrade to the company's 630 Multitasking Terminal; and the 730X Terminal, an X/Windows terminal. The new terminals offer increased terminal emulation and networking enhancements compared with their predecessor.

The 730X Terminal's main function is to handle graphics manipulation and to off-load application processing to a host computer, AT&T said. The 730 MTG, by contrast, can perform some local processing while also relying on a host.

The 730 MTG emulates Tektronix, Inc. 4014 graphics terminals, a capability not offered on the AT&T 630 Terminals. The 730 MTG also enhances the ANSI terminal-emulation capabilities of the AT&T 630 with support for a greater variety of character sets, as well as fully programmable function keys.

The 730 MTG can be upgraded into a 730X X/Windows terminal.

The 730X has all the functionality of the 730 MTG in addition to supporting the X/Windows protocol.

By establishing a communications session with AT&T's Windowing Utilities Package running on an AT&T host, users of the 730X can display up to seven separate application windows for each connection, and each window can communicate with the host as if it were a separate terminal.

Both terminals can communicate with their hosts over AT&T Starlan or Transmission Control Protocol/Internet Protocol-based networks, as opposed to the older AT&T 630, which did not offer local-area net support.

AT&T added terminal support and new net interfaces to bolster its 3B4000 minicomputer.

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The 730 MTG and 730X will be available in February 1990. The 730 MTG costs $2,495, while the 730X with 1M-byte memory is priced at $2,995. With 2.5M-byte memory and a Starlan interface, the terminal costs $3,695.

3B4000 net additions

AT&T added a wider range of terminal support and several new net interfaces to bolster its 3B4000 high-end minicomputer.

For the first time, AT&T added a Streams interface capability to the 3B4000. The addition of Streams will enable users to significantly increase the transmission speed of data from the internal bus of a 3B4000 to a Starlan network running at 10M bit/sec. Previously, the 3B4000 could only transmit data at up to 19.2K bit/sec.

AT&T also said it would off-load the X.25 functions of its X.25 Release 1.2.1 software, which previously ran on a 3B4000 and 3B2 Adjunct Communications Processor (ACP), to a single ACP.

A stand-alone ACP can also be

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AT&T broadens data systems' net options

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outfitted with a General Purpose Synchronous Card (GPSC), which will now allow X.25 communications to occur at speeds up to 64K bit/sec. Previously, X.25 transmissions peaked at 19.2K bit/sec.

The company also off-loaded processing for its TCP/IP over Ethernet Release 2.1.1 software from the 3B4000 to a single ACP.

In addition, AT&T distributed its Datakit II Virtual Circuit Switch (VCS) software, which previously ran on a single ACP, to instead run on up to seven ACPs. This greatly expands the number of terminals Datakit can support.

All 3B4000 enhancements are slated to be available in December.

X.25 Release 1.2.1 costs $10,000; the GPSC board for X.25 Release 1.2.1 costs $2,950; TCP/IP over Ethernet Release 2.1.1 costs $12,000; and Datakit II VCS costs $10,000.

AT&T's high-end minicomputer now also supports the AT&T 615 Color Multitasking Terminal and the AT&T 630 MTG. Previously, it only supported monochrome terminals. The 3B4000 also supports the new 730 MTG terminal.

Token-Ring options

The company also rolled out software and hardware that connects to IBM Token-Ring LANs its AT&T 6500 Multifunction Communication System, a family of IBM 3174-compatible terminal controllers and 3270-compatible terminals and printers.

A Token-Ring interface card, the T-Module, which must be used with Release 3.3 of AT&T's Multifunction Communication System software, gives 6500 MCS users three options for linking to a Token-Ring Network.

A 6544 Token-Ring client configuration will let IBM 3270-compatible terminals and printers attached to the T-Module in a 6544 terminal controller access Systems Network Architecture hosts via a Token-Ring. It costs $2,777.

A second option enables devices attached to the 6544 to connect to an IBM mainframe channel over a Token-Ring acting as a gateway. This option is priced at $5,277.

Lastly, users can access a Token-Ring via a T-1 Module in the 6544 that supports dial-up SNA/Synchronous Data Link Control connections to the Token-Ring LAN. It costs $5,610.

The Token-Ring products will be available in February 1990.

Fiber module debuts

The newly introduced AT&T Fiber Expansion Module (FXM) is designed to increase to 338 the number of asynchronous devices, such as terminals and printers, that can be connected to an AT&T 3B2 minicomputer. Previously, the 3B2 could only support as many as 90 devices.

FXM has three components: a standalone FXM chassis, which resides between the connected devices and the 3B2; a 3B2 FXM feature card, which resides in the 3B2 and provides the link between the host CPU and the FXM chassis; and fiber-optic cabling, which links the 3B2 to the FXM chassis and connects FXM chassis daisy-chained together.

The chassis provides ports for terminals, printers and personal computers. It holds a Multiplexer Circuit Card, which provides a 10M bit/sec interface from the FXM feature card to the chassis and to daisy-chained chassis.

Daisy-chained FXM chassis can support a maximum of 256 devices. To surpass that and connect up to 338 devices, users can plug into the 3B2 as many as 10 Enhanced Ports cards, each supporting eight physical connections.

Optional I/O Processor (IOP) circuit cards give users eight RS-232 ports for connecting additional asynchronous devices. The FXM chassis can hold a maximum of four IOP cards.

FXM is scheduled to be available in December 1989. The feature card is priced at $5,000, a 32-port FXM with one IOP costs $4,275, and an IOP card has a list price of $1,900.

AT&T can be reached in writing at 1 Speedwell Ave., Morristown, N.J. 07960, or by calling (800) 247-1212.

First Look

continued from page 43

Pricing for the four cards is expected to be available by year end.

Lantana Technology, Inc., 4393 Viewridge Ave., Suite A, San Diego, Calif. 92123; (619) 565-0798.

Absolute Security releases security, audit software for VAX

Absolute Security, Inc. recently introduced security and audit software that gives users on a Digital Equipment Corp. VAX early warnings of data corrupted by unauthorized alterations, viruses or Trojan horses.

Investigator Plus runs on an MS-DOS workstation with an RS-232 or Ethernet connection to the VAX/VMS.

The software alerts the system manager to unauthorized alterations of data and provides reports on the specific lines of code that have been altered. It monitors files 24 hours a day and gives management up-to-date information in the form of alerts and reports of file changes.

An audit function provides information about changes made to a program, allowing the auditor, for example, to find irregularities.

Security functions detect all modifications to the computer's software libraries, eliminating intentional alterations designed to disrupt the operation of the data center or execute unplanned, potentially destructive activity in the future, the company said.

Communication solutions from Rockwell.

The assignment was demanding. The integral modem for the company's new Laptop would have to be compact and inexpensive. With the complete '88 AT command set, plus the lowest possible power consumption.

"The features they packed into the world's first single-device V.22bis modem blew us away."

Fortunately, the engineers already know who to call: Rockwell International. They're aware that no matter what the application, Rockwell's new V.22bis family provides capabilities nobody else can supply.

They've read how Rockwell stunned the industry with its RC224AT—the world's first fully integrated single-device modem solution. And how this one compact component offers CCITT V.22bis and V.22, as well as Bell 212A and 103 compliance, plus value-added features such as power-saving Automatic Sleep Mode. Not to mention the assurance of a five-year warranty.

Their call to Rockwell also reveals how the V.22bis family can help with future projects. They learn about the capabilities of Rockwell's RC2324DP chip set.

See the FAXNeT Form on Page #91

Investigator Plus costs $8,500 and is available now.

Absolute Security, Inc., P.O. Box 399, 63 Great Road, Maynard, Mass. 01754; (508) 897-1991.

New card, software enable facsimile transmission from PC

Share Communications, Inc. this week will introduce at Comdex/Fall 1989 a software program and interface card that lets users transmit facsimiles directly from a personal computer.

FaxShare runs on any IBM Personal Computer running DOS 3.0 or higher on a variety of local-area networks. It does not require the use of a dedicated personal computer or an electronic mail system for delivery and notification of faxes, which gives it an advantage over competing products, the company said.

The user interface consists of pop-up menus and pull-down screens. Both text and graphics files may be sent, and fax documents may be composed using the built-in word processor. The company said there are no limits on the size of files that can be transmitted.

A phone-book feature lets users create groups of frequent fax recipients.

Every user receives a fax identification code to ensure security and privacy for both outgoing and incoming documents, according to the company.

FaxShare is available now. It costs $2,495 for the interface card and software for 10 users. Additional users may be added for $295 per 10-user group.

Share Communications, Inc., The Tower Building, Suite 1403, Seattle, Wash. 98101; (206) 292-8883.

Cryptall E-net bridge supports fractional T-1 speeds

Cryptall Communications Corp. recently introduced an Ethernet-to-wide-area bridge capable of transmitting data at speeds ranging from 4.8K bit/sec to fractional T-1 increments up to 768K bit/sec. The company said the new **3000 Series FT1** bridge is the first local-area network bridge to operate at fractional T-1 speeds.

The 3000 Series FT1 is the latest in the 3000 line. That family also includes the 3000 Series T-2 bridge and the 3000 Series UB, which support data rates up to 10M bit/sec. The FT1 bridge, which connects one Ethernet to a fractional T-1 circuit, is upgradable to high-end models.

The bridge supports the Spanning Tree Algorithm, which enables it to learn the network's topology to route data using the most efficient path. It also configures alternate data paths to ensure continued transmission if the primary path experiences a failure.

The product is available now for $5,500.

Cryptall Communications Corp., 1110 Wellington Ave., Cranston, R.I. 02910; (401) 941-7600.

Adacom intros port expander for 3174/3274 controllers

Adacom Corp. recently introduced an intelligent port expander for IBM 3174/3274 controllers that supports up to five 3270 terminals, personal computers or printers.

Adastar supports Distributed Function Terminal capabilities so that each of the five attached devices can appear to a Systems Network Architecture host as a logical unit rather than as a physical unit.

The 3174/3274 controller has 32 ports. Connecting Adastar to each of them enables a single controller to support up to 160 terminals, the company said.

Adastar can attach either directly to the controller via coaxial cable or IBM wire, or to a 3270 coaxial multiplexer. It extends the maximum coaxial distance between the controller and terminal to 10,000 feet.

Adastar is available now for $1,995.

Adacom Corp., 8871 Bond, Overland Park, Kan. 66214; (913) 888-4999.

Codenoll interface boards link PC ATs, PS/2s to FDDI backbone

Codenoll Technology Corp. recently unveiled a series of interface boards to link IBM Personal Computer ATs and Personal System/2s to a Fiber Distributed Data Interface (FDDI) backbone.

The **CodeNet-9540 Series 100 Mbps FDDI** and **CodeNet-9340 Series 100 Mbps LowCost FDDI** local-area network boards are single-slot adapters that support a variety of LAN operating systems, including Microsoft Corp.'s LAN Manager and Novell, Inc.'s NetWare 2.1X and NetWare 386.

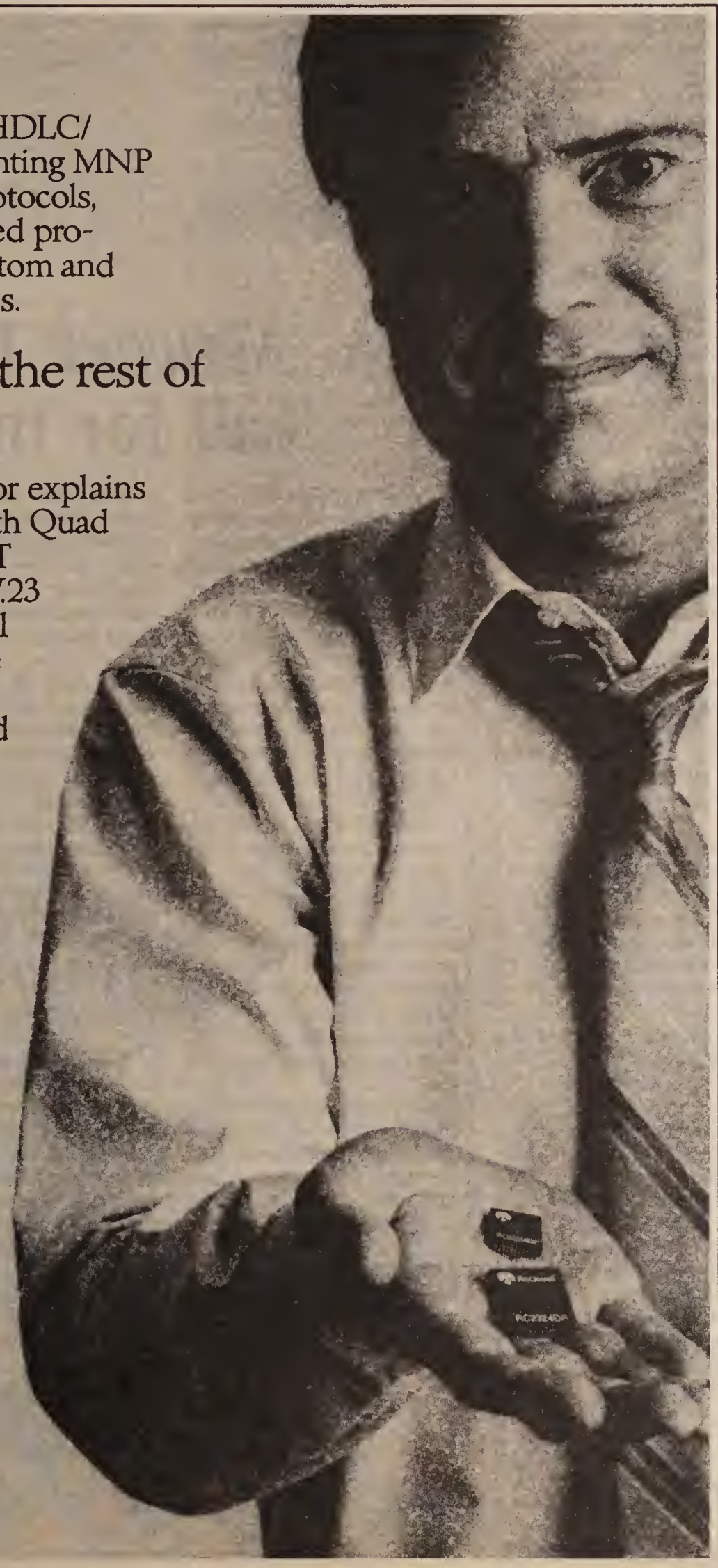
The 9540 conforms to all published specifications of the X3T9.5 FDDI standard. The 9340 board generally conforms to FDDI standards, but it does not meet the standard requirement for the maximum distance between nodes on the FDDI dual counterrotating ring network.

Under the FDDI standard, the maximum distance between nodes is 2,000 meters, Codenoll said. The 9540 can support that distance, while the 9340 only allows a maximum distance of 1,000 meters between nodes.

Both adapter cards are available in three configurations: one offers attachment to a single fiber ring and a single fiber transceiver; another offers attachment to a single fiber ring and a dual transceiver; the third offers attachment to a dual ring and a dual transceiver. The 9540 boards cost $4,995, $7,495 and $9,995, respectively. The 9340 boards cost $3,995, $5,295 and $7,695.

They will be available in January 1990.

Codenoll Technology Corp., 1086 N. Broadway, Yonkers, N.Y. 10701; (914) 965-6300.



They hear how it provides HDLC/SDLC framing for implementing MNP 5™, X.25, LAPM and V.42 protocols, while offering unprecedented programming flexibility for custom and country-specific applications.

"And then we met the rest of the family."

A Rockwell technical advisor explains that it's the only chip set with Quad capability that meets CCITT V.22bis, V.22A/B, V.21 and V.23 requirements, as well as Bell 212A and 103 standards. He adds that the RC2324SME offers capabilities optimized for Europe, including MNP 5™ and V.25bis.

In no time, the Laptop project is ready for production. To management, the results—as well as the engineers responsible—couldn't look better.

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OPINIONS

RETURN ON INVESTMENT

BY JAMES KOBIELUS

Bring user expectations down to earth

Here's some bad news for all you telecommunications managers out there: Demonstrating the business payoff from the systems you build, install and operate is not going to get much easier.

You may think you've grown more sophisticated in your ability to press the business case for various information technologies, and in fact, many of you have. You're working more closely with strategic business planners and have begun to speak their language. The smartest among you have developed some impressive return-on-investment measures for information technology systems. Ironically, though, this has only increased the pressure on you to justify what you do.

In so doing, you may have set yourself up for a fall. You're likely to find that none ofyour real accomplishments quite measure up to this scenario of infinite promise.

> For users, all those megasystems still in development are out of sight and out of mind.
>
> ▲▲▲

You need to bring users' expectations back into line with the actual capabilities of the technologies. There are three general ways for bringing them down to earth.

■ Go easy on the more-strategic-than-thou attitude. Sure, information technology can be a critical element of corporate success but not more so in principle than a well-conceived, well-implemented research and development, marketing or human resources strategy. A sense of perspective and a dash of humility are in order here.

■ Deliver information technology systems with quick, visible impacts for users. Steer clear of "grand designs" that take forever to build and for which the rationale cannot be stated in 25 words or less. Users will always evaluate you and your accomplishments along a sliding scale. Most important in their eyes is what you have done for them lately; for users, all those megasystems still in the development pipeline are out of sight and out of mind.

■ Have the courage and creativity to seek quantitative measures where others see only intangible business benefits from information technology. Be a crude reductionist: Reduce everything to numbers, and make sure they tie into real business concerns. Once you've identified what drives business success, such as quality products, satisfied customers and innovative employees, you'll have a pretty good idea what to count.

These concrete measures are near-indisputable indicators of whether you've succeeded. By contrast, intangible and qualitative benefits leave doubts in everyone's minds as to whether it's all just smoke and mirrors.

Once you've established concrete payoff measures (preferably right up front in the business plan), use them throughout the system's life cycle. As Peter Keen, president of the International Center for Information Technology, has observed, many system proposals are in the genre of light romantic fiction. Advocates of a particular technology marshall any number of anticipated benefits to support their case. Once approved and built, many systems are taken as given and are seldom subjected to intensive scrutiny to determine whether they are providing the promised benefits.

Good information technology performance measures are only meaningful within a continuing program of measurement and zero-based rejustification. Over the course of a life cycle, a system should have to sell itself again and again.

Kobielus consults on information technology in Alexandria, Va.

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EDITORIAL

ICA, *Network World* sponsor 'Call for Innovation'

Attached to this week's issue is an entry form for the International Communications Association (ICA)/*Network World* "Call for Innovation" program.

If your company is a member of ICA, we encourage you to enter the fourth annual "Call for Innovation" program. If your company is not a member and can meet ICA's eligibility requirements, you can join ICA and participate in this exciting event.

Network World is pleased to be working with the ICA to promote this special program, which honors communications professionals in ICA member companies for their innovative efforts in applying network technology to solve problems and create new business opportunities.

Cosponsoring the "Call for Innovation" gives *Network World* another opportunity to recognize users who've channeled the power of network technology to improve business operations or offer new products and services. That dovetails nicely with our mission to provide the news and analysis users need to apply the wealth of network products and services to meet business goals.

Each week in our news, features and technical sections, *Network World* spotlights companies and individuals that are applying communications to gain a competitive edge.

Each year, *Network World* honors some of the most innovative companies, universities and government agencies through our annual User Excellence Awards (see the upcoming Dec. 18 issue for this year's winners).

Now, through the "Call for Innovation," the ICA and *Network World* will jointly honor end users in ICA member organizations for their outstanding achievements.

How does the "Call for Innovation" program work?

Call For Innovation

To enter, fill out the qualification form attached to this issue. You must write a 150- to 250-word abstract outlining your work in one of three categories:

■ Original research conducted in your organization that resulted in new applications for technology.

■ Applications that encouraged a vendor or vendors to develop new products or services to meet your needs.

■ Actions taken by your company that had a positive impact on standards or regulatory issues.

Then simply mail the postage-paid, preaddressed entry application to *Network World* by Feb. 1.

If there is no entry form on the outside of your Nov. 13 issue of *Network World,* call us at (508) 820-2543, and we'll send you one.

If you're selected, you'll have the chance to present your project to the ICA membership at a featured session during the ICA 1990 conference, to be held May 20 to 25 in New Orleans.

The ICA will publish a journal of all qualified "Call for Innovation" papers, and presentations will be considered for publication in ICA's award-winning Communique publication.

We've published a list of all current ICA member organizations on the inside back cover of the entry form.

Check the list if you're not sure whether your company is an ICA member. We've also published ICA eligibility requirements on the inside back cover that you may review if your company is interested in becoming a member.

If you have any questions on ICA membership or the "Call for Innovation" event, call the group at (800) ICA-INFO.

Please take the time to enter the "Call for Innovation" program if your company belongs to ICA. If your firm is not a member and you want to participate in this prestigious event, look into joining ICA.

Get the recognition you deserve for your innovative communications applications — and good luck.

OPINIONS

NETWORK MANAGEMENT

BY JAMES HERMAN

Unbundling net management poses difficult choices

A major industry event occurred at this year's Interop '89 conference in early October: More than a dozen vendors held the first major product demonstration of multivendor network management. It was quite exciting to see one management workstation after another look into the guts of the bridges, routers, terminal servers and workstations on the show floor.

Why is this so important? Because for the first time, network equipment has been unbundled from network management.

Until now, network managers needed to buy network management software — if there *was* any — from the vendor that sold them their network equipment. But as the products shown at Interop mature over the next year, users will be able to pick a single management workstation from a vendor of choice to monitor and control the entire multivendor collection of Transmission Control Protocol/Internet Protocol equipment.

The ability for one vendor's management software to interact with another vendor's network host or device presents some interesting choices. How will you choose a net management system when any system can get the raw information from the network? There are three possibilities:

■ You could continue to buy the management product from your primary equipment vendor. That might be your bridge/router vendor or your workstation vendor. One might expect that a vendor would do the best job of managing its own equipment — by doing more with the information, interpreting it more fully or understanding subtle symptoms better.

In this model, users can afford to have slightly less sophisticated management of the other vendors' devices in their network, but they must retain detailed network management for the foundation of their backbone.

Vendors might push this argument to the point where the user is convinced of the wisdom of limiting future purchases to those best supported by the adopted management product — that is, those of the primary vendor — and the situation will be changed very little from the way it is today.

■ You could go with the network management product you find most useful. This could possibly be provided by yet another vendor, different from those already providing network equipment.

If network management and network equipment become truly unbundled, you will be able to choose on the basis of functionality, ease of use, performance and cost — and not compatibility.

If this model develops, vendors may specialize. Competition among management packages will be fierce, and large investments will be needed to stay in the race to provide the winning solution.

Many equipment vendors will stop offering management systems directly; if needed, they can merely buy one from management specialists, which will act as OEMs. By keeping their options open, users will be giving themselves the opportunity to buy the best. This will foster healthy competition, which will result in better products.

■ You can take pieces of network management software and build your own. This approach is predicated on the assumption that no two networks are the same and no two networks run the same. If you want good management software, you need to customize everything you plan to use.

In this model, users prefer to put together their own software rather than buy something that doesn't meet their needs. This is often what is done today and is understandable in the context of the TCP/IP hacker ethic — the well-known tendency of TCP/IP users to hack, or customize, their own networking software.

But long-term support and maintenance problems may make such strategies costly and frustrating down the road. Users who embark on this course should do it with the clear realization that they will be forced to replace what they're building within two years.

The unbundling of management and the network is proceeding rapidly in the TCP/IP world because of the huge vacuum for good management products and the fierce open spirit in this segment of the industry. Don't expect a similar revolution soon in other areas of networking.

The competition brought on by these changes should spur rapid improvements in TCP/IP internet management, further increasing its attractiveness as an open systems standard for multivendor networking. Once again, events are proving that open systems provide the greatest opportunity for growth and change, benefiting the users and new innovative vendors.

The Interop '89 event is also important because it provides further evidence that TCP/IP, in general, and its peculiar open standard for network management — Simple Network Management Protocol (SNMP) — are sure to delay the widespread adoption of Open Systems Interconnection standards.

OSI is the best thing that ever happened to TCP/IP. It legitimized vendor-independent protocols. But for many, OSI appears to be much too late; this is also true now in the management arena.

SNMP and TCP/IP may not be ideal solutions, but they have the distinct advantage of being widely available now. The more systems that use TCP/IP and SNMP, the more valuable they are and the greater the pressure for other systems to come into the fold.

A TCP/IP and SNMP snowball is developing. OSI protocols and management may find a chilly reception in U.S. corporate networks.

Herman is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting collaborative specializing in management, communications and information strategies.

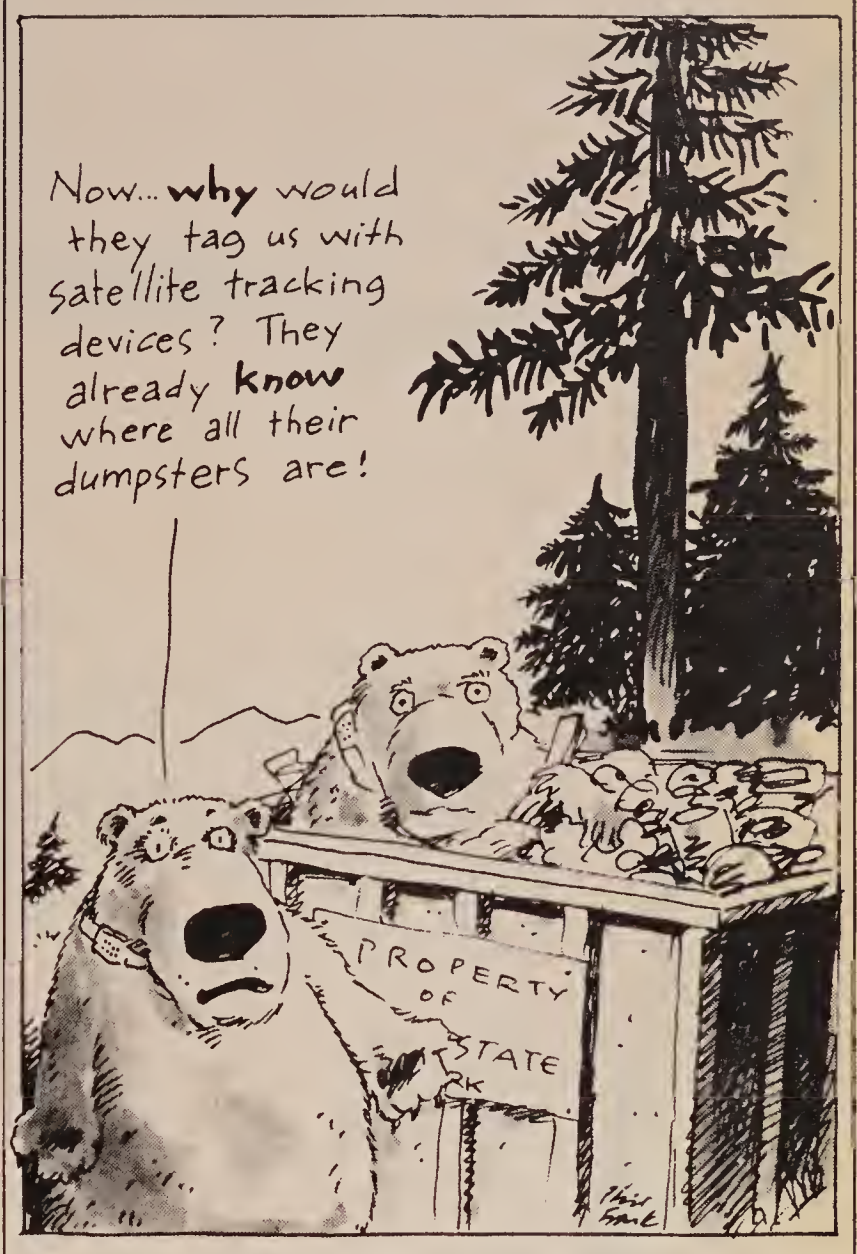
WHEN ANGRY, COUNT TO TEN; when very angry, swear. Then, let us at *Network World* know what's bothering you by writing an opinion column.

Manuscripts should be letter-quality, double-spaced and between 600 and 900 words in length. Disk or modem submissions are preferred.

If you'd like to write one, call Steve Moore, features editor, at (508) 820-2543, ext. 732, or fax your idea to us at (508) 879-3167.

TELETOONS

BY FRANK AND TROISE



LETTERS

GM's actions on target

Your Oct. 23 editorial, "If GM doesn't get its way, it will take its ball and go home," missed the mark and cannot be ignored.

As a founding member of the North American ISDN Users' (NIU) Forum, we helped draft the charter, write the procedures and solicit many of the members who now chair the various committees.

We have and will continue to strongly endorse the NIU Forum's goals and objectives. We recognize, however, that all large organizations — including the NIU Forum — must be on guard to protect against a phenomenon best described by General Motors Corp. competitor Mr. L. Porsche.

"Committees are, by nature, timid. They are based on the premise of safety in numbers, content to survive inconspicuously, rather than take risks and move independently ahead," he said.

When viewed in this context, GM's attempts to "spur action by the NIU Forum" were both appropriate and on target.

Those of us in continuing leadership positions with the forum recognize that when GM "laid out a set of goals" at the recent Phoenix meeting, it was trying to spur the forum to conclude work that had been stalled for months.

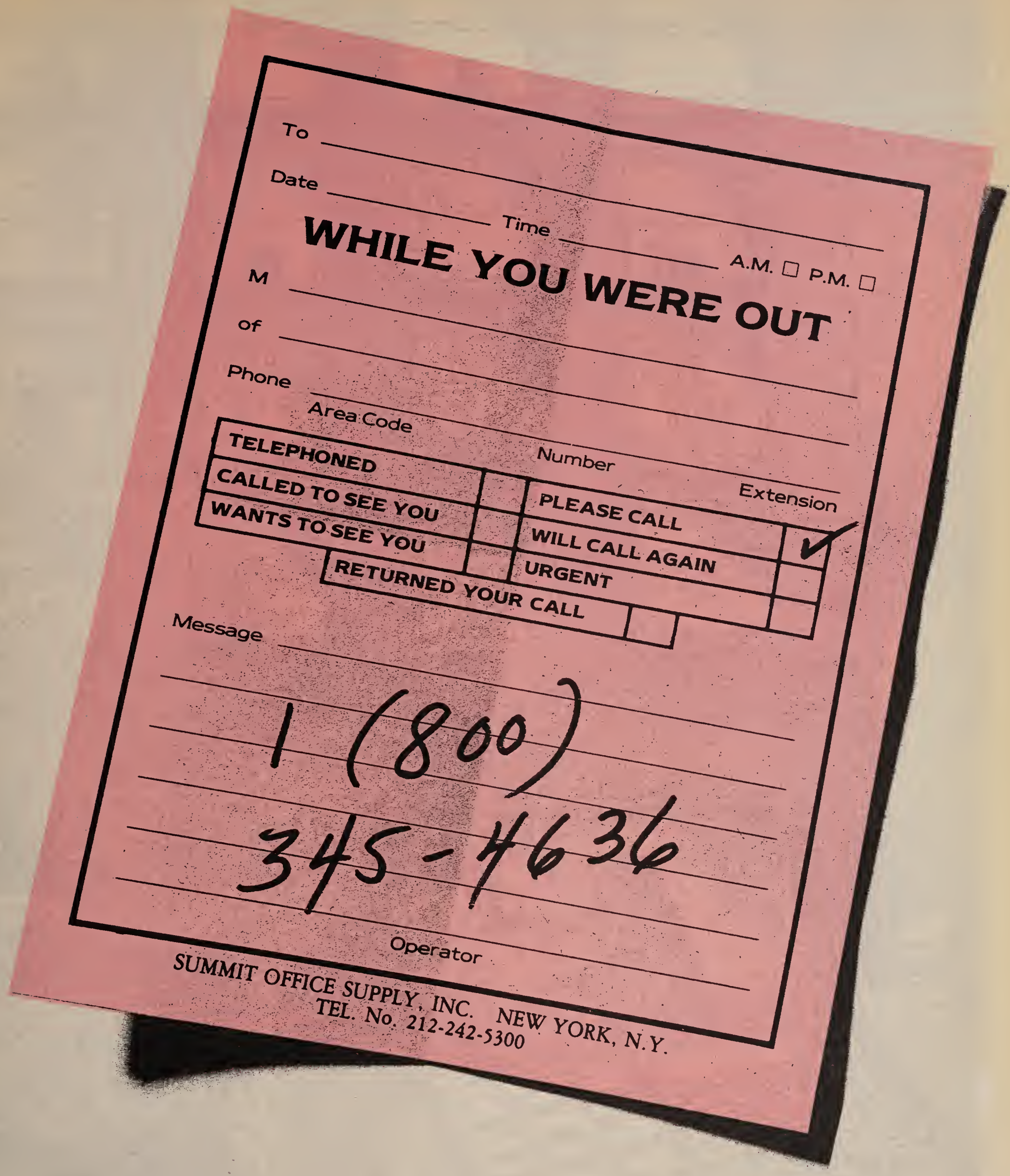
In the specific example of GM's desire to finalize plans for an NIU Forum-sponsored multivendor Integrated Services Digital Network event, it should be recognized that GM proposed a solution that would have allowed the forum to move ahead and officially bless the selection of the event's location.

The recommendation to hold the event at the SuperComm '91 show, scheduled for March 1991, had already been approved by the Event Selection Committee and approved again by the entire Application, Demonstration and Promotion Working Group. That the forum's Executive Steering Committee decided "not to decide" is a matter of public record.

That GM attempted to resolve an issue that had been discussed for more than nine

More letters, page 83

The only way to get a T3 networking multiplexer



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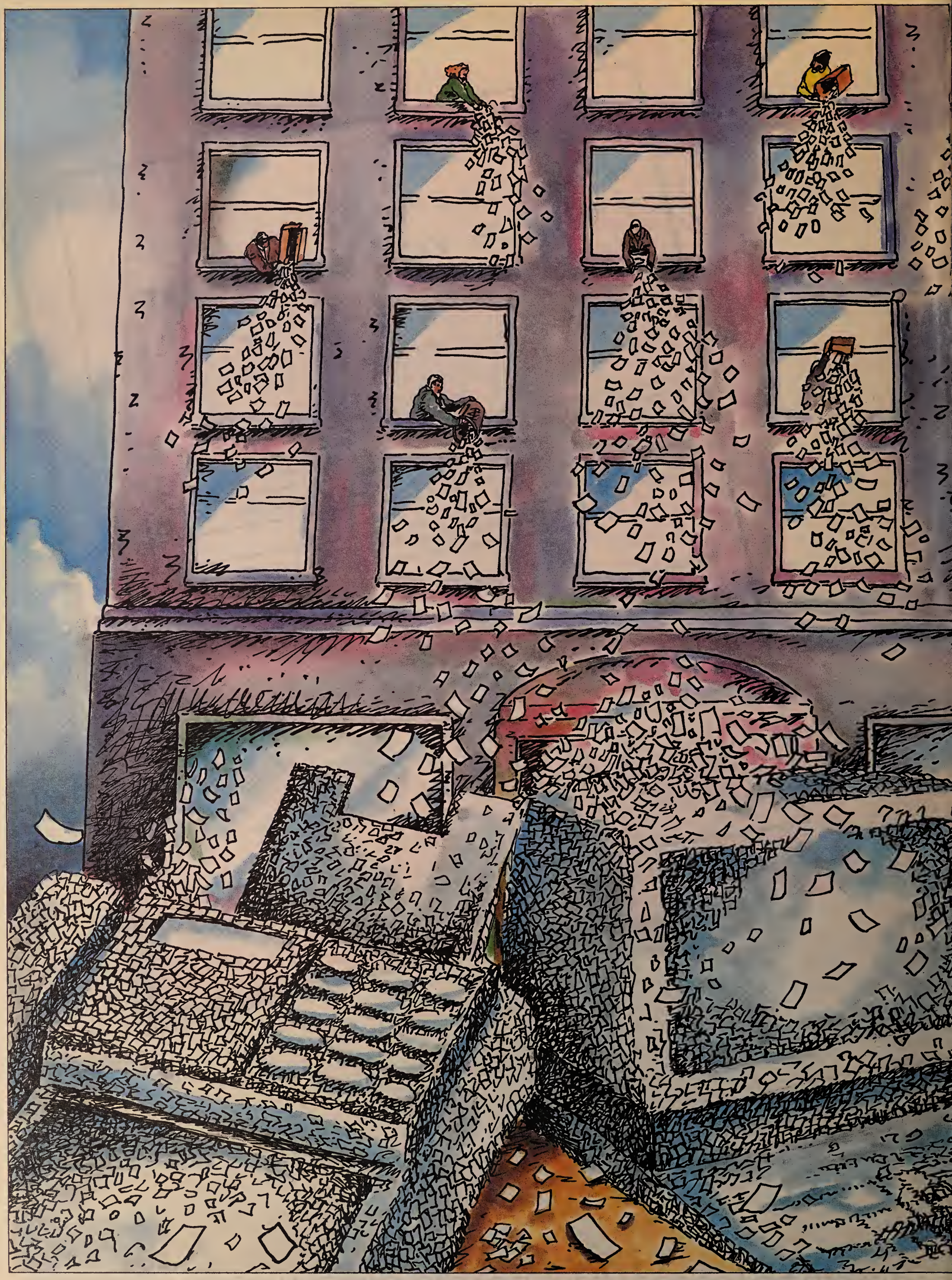

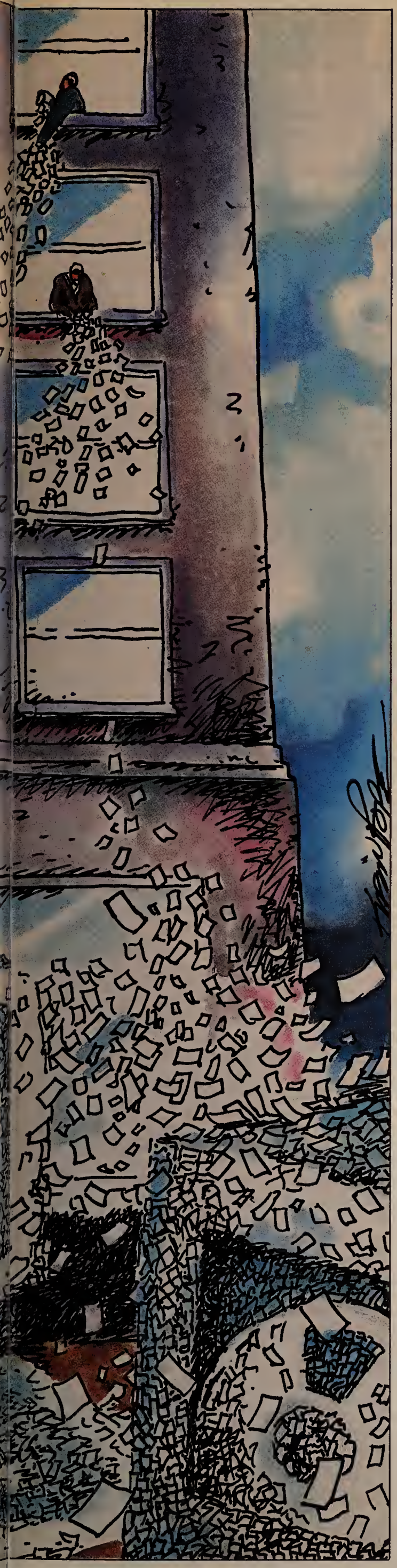

The end of the paper chase

Relational data bases, expert systems and image processing are revolutionizing the way insurance companies do business.

The revolution in information and communications technology over the last 15 years has paralleled tremendous turbulence in the insurance industry. Most life and health insurance policies in today's marketplace, such as universal and variable life insurance offerings, hardly resemble those sold 10 years ago.

Competition for market share is a leading factor. Today, insurance companies compete not only with one another, but also with a veritable banquet of financial institutions, brokerage houses and investment firms. International institutions are quickly moving into U.S. markets, bringing their own products to the table.

More and more organizations are realizing that their information systems and the data that they contain are a strategic corporate asset. The rate of return on this information asset depends on the enabling technology — the network.

The network's value lies in making key information available to the right person, in the right form, at the right time. Just as corporate assets must be managed to maintain the proper level of liquidity, a network must be managed to make information "liquid," or available.

Croaff is principal of Croaff Associates, an Oakland, Calif.-based consulting firm specializing in automation technologies and marketing.

Historically, insurance companies have handled their processing on a contractual or policy basis. Often an organization uses separate systems for different lines of business. As a result, the company may have only a fragmented picture of a customer.

Getting the picture

The evolution of relational data bases and processing technologies — combined with the power of a market-driven, highly competitive and dynamic industry — have caused many companies to reevaluate what it takes to fit the pieces together. The information systems of the 1990s will have a new emphasis on data, and its avail-

(continued on page 52)

By MARVA CROAFF

ILLUSTRATION ©1989 KEVIN POPE

(continued from page 51)
ability and consistency throughout all parts of the organization.

The 1990s will see a massive use of relational data bases, both central and distributed. Cognitive, knowledge-based systems, also known as expert systems, will interpret the data.

To capture, store and present the data, companies will use image processing (optical scanning, storage and retrieval), executive information systems and decision support combined with voice and video technologies.

These high-level technological tools use relational data bases and fourth-generation languages as the foundation for information systems that are revolutionizing the way insurers do business. For example, the abundance of available demographic, census and credit data enables insurance companies to develop specific products to fill definable, specialized customer needs.

Some of the largest insurers in the country, such as The Travelers Corp., Metropolitan Life Insurance Co. and New York Life Insurance Co., have been among the first to feast at the information cornucopia.

The Travelers

The Travelers, based in Hartford, Conn., uses one network for the entire company, with 37,000 employees, including subsidiaries, using about 37,000 intracompany terminals. The single net carries voice, data and image, and comprises both local- and wide-area networks (WAN).

About 250 domestic locations are included in the WAN using a combination of T-1 and DS1 lines. Currently, 20 sites use DS1 backbone connections; that number could reach 40 by the end of 1990. About 40 locations support LANs attached to the WAN; 99% of the intelligent workstations are members of the network.

Trav Waltrip, The Travelers' vice-president of data processing in charge of telecommunications, points out that the network provides the foundation, once stabilized and integrated, for access to the corporate information system (CIS), which serves as the core repository of all insurance processing.

The CIS then integrates other emerging technology data and processing information into the relational data structures.

According to Waltrip, The Travelers' net is currently transmitting voice, voice mail and voice store-and-forward. The voice component of the network uses the AT&T Audix voice-processing system.

The network's data component carries a tremendous volume of DP applications for the continual processing of insurance policy applications, claims and proposals.

The audio teleconferencing component uses Golden, Colo.-based ConferTech International, Inc.'s digital audio bridge, providing conference audio, synchronized graphics and one-way video.

The management center uses that component to broadcast announcements and communications throughout the organization; The Travelers communicates to the field using slide material and one-way video.

The Travelers is studying the feasibility of expanding the use of real-time facsimile in such processing applications as medical claims processing and individual application processing.

In addition, the company has developed decision support and executive information programs that help employees present and display processing data in more meaningful and useful formats.

The Travelers' network uses two types of knowledge-based systems: those supporting the net and data center operations, and those supporting the application-processing areas and such functions as underwriting and claim adjudication.

"[The] Travelers currently uses at least four knowledge-based systems to run the net and data center operations," Waltrip explains. "Three knowledge systems are running on DOS, and one is a Micro Channel PS/2 running on OS/2. One such system receives error codes, helps the operator review them and then recommends action to take, while another system monitors the net graphically."

The Travelers operates two data centers. The first, situated in Hartford, provides host and net control to the second center, in Atlanta.

> The 1990s will see a massive use of relational data bases, both central and distributed.
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The Atlanta center, which is unmanned, is operated from the host control center in Hartford.

The Hartford and Atlanta DP sites each have a rooftop earth station for transmitting to and receiving communications from an MCI Communications Corp. satellite located about 23,000 miles above the earth.

This setup allows The Travelers to rearrange resources instantly, processing a job in Atlanta with the results of a processing job that was run in the Hartford center.

For the future, The Travelers is studying fast packet switching and the feasibility of moving from DS1 to DS3 fiber. The addition of two-way video to the network's current video capability is a possibility. The company is also evaluating management issues such as centralized billing.

Met Life uses a backbone net-

(continued on page 54)

Independent agents gather under IVANS flag

In the U.S. insurance industry, independent agents, concerned about their loss of market share to direct sales forces such as State Farm Life Insurance Co. and Allstate Life Insurance Co., developed industrywide standards for electronic data interchange. The effort led to the development of Insurance Value Added Network Services (IVANS), an independent nonprofit organization based in Greenwich, Conn.

IVANS was formed in 1983 to provide a common data communications facility for all members of the insurance industry doing business through the independent agency distribution channel. It links insurance agents, insurance carriers and many other information sources for both agents and companies.

With consumers able to access information about life insurance products from a range of suppliers, independent agents needed a way to prevent electronic bypass. IVANS contracted with the IBM Information Network, a worldwide data communications network, to provide the physical data network.

Currently, 61 insurance companies and 45 provider organizations communicate with more than 9,000 insurance agents through IVANS.

According to Robert Barham, IVANS president and chief executive officer, "IVANS' long-distance voice program will yield significant savings to companies and agencies. By year end, IVANS' voice participants will be billing at a rate in excess of $60 million annually and enjoying a significant discount based on that volume."

According to Barham, 1990 will see continued emphasis on lowering cost and increasing efficiency through expanding network functions. Particular emphasis, he says, will be placed on reducing access costs through network expansion, lower 800 number pricing and increased leased-line usage.

IVANS offers savings to its members through a joint agreement with MCI Communications Corp. to provide telecommunications services at a discount. Agents receive a flat 10% discount on daytime, long-distance calls (no volume commitment), and companies receive a 5% to 9% discount on net incremental use of MCI services.

Individual IVANS member companies are already receiving discounts of as much as $180,000 annually, and their use is growing. Attracted by this program, increasing numbers of companies are contacting IVANS. Among such new participants are Continental Insurance Co., New York Life Insurance Co. and The Prudential Insurance Co. of America.

> IVANS offers savings to its members through an agreement with MCI.
>
> ▲▲▲

Hank Guckes, vice-president of operations, telecommunications and technology at Continental, explains, "The MCI discount and subsequent savings alone was reason enough for Continental to join IVANS."

Through IVANS, the industry avoids repetitive capital expenses associated with proprietary company networks. It allows communications with multiple companies, business partners and service providers, and uses existing automation systems. Because users do not need special communications lines or equipment, linking to the network can be done quickly and cost-effectively.

Users on a company network can access the Insurance Information Institute of America (III) data base as well as a range of other service provider products from the same terminal they use for company work. New York-based III provides statistical information for the property and casualty segments of the insurance industry. The Insurance Services Office, also headquartered in New York, provides commercial fire rating data base information.

The Dun & Bradstreet Corp. offers access to an extensive business information data base covering more than nine million public and private companies. The Dow Jones News/Retrieval Service provides news and financial information, including statistics and forecasts, company profiles, quotes, market averages, and business and general consumer services.

Chicago-based Certified Collateral Corp. offers verification of vehicle identification numbers and optional insurance rating symbol service. Equifax, Inc.'s Agency Ordering System and Policy Management Systems Corp.'s Motor Vehicle Report Processing Service provide motor vehicle reports. Atlanta-based Life Office Management Association, which tracks life insurance industry statistics, offers educational and informational resources.

IVANS provides intercontinental network service to more than 80 countries — from Canada and Europe to the Middle East and Asia. The London Insurance Market Network and Reinsurance and Insurance Network have both selected IBM network services that are European counterparts to the IVANS U.S. network service.

IVANS now offers its member companies a low-cost program to provide interfacing agents with a special IVANS Network Connection. The permanent, high-speed, high-quality leased-line connection to IVANS is available for a fixed, low monthly fee. This type of connection is particularly appropriate for a multicompany interactive interface since multiple terminals on an agency's system may communicate simultaneously with multiple insurance companies.

Since 1984, IVANS has earned discounts of $13.1 million on IBM network usage. The discount rate to member companies increased from 28.5% below IBM network standard prices in December 1987, to 48% below standard prices by January 1989.

As network usage grows, membership assessments continue to be reduced. Assessments were reduced by 25% in 1988 and 1989. Assessment rebates to members in 1988 exceed total member assessments paid in 1984. IVANS expects membership savings to reach $6 million in 1989 — with $4.5 million in IBM network discounts and $1.5 million in MCI usage rebates.

IVANS now provides an electronic marketplace where companies, agencies and their business partners find the lowest cost, easiest use and highest efficiency. As electronic markets drive companies to reposition themselves and to rethink the way they conduct business, they will create more essential changes in the economy.

— Marva Croaff

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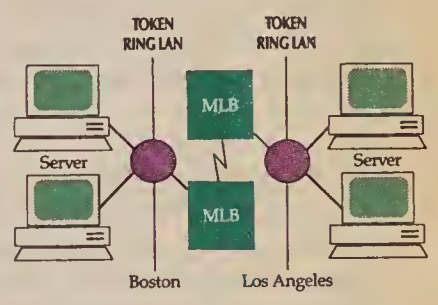

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(continued from page 52)
work that ties four major processing centers located in Greenville, S.C., New York, Scranton, Pa., and Wichita, Kan. These centers support discrete business units and are linked with multiple T-1 lines. Employee terminals performing interactive tasks in branch and claims offices are linked using 56K bit/sec tail circuits.

The company's network handles five million data transactions per day with 20,000 interactive user terminals and 7,400 personal computers. The firm's 12 IBM mainframes have a combined processing capacity of more than 500 million instructions per second.

According to Daniel Cavanagh, the company's senior vice-president of information systems, the backbone is a critical part of Met Life's preparation for emerging technologies. For about four hours per day, Met Life employs a fractional T-1 line using 384K bit/sec multiplexers to carry video between its New York and Wichita sites.

New York Life's nets

New York Life's telecommunications network encompasses approximately 260 domestic locations, plus locations in Canada, Ireland and Hong Kong. The company plans to expand the net as the firm expands globally. The network has seven major nodal concentration locations nationwide, which are linked via MCI 56K bit/sec circuits to a primary processing location in Clinton, N.J.

There are approximately 15,000 devices on the net, including personal computers, 3270 terminals and IBM Series/1s. All points of failure in the net have been identified and eliminated through multiple carriers, diversity, alternate routing, switched services, dynamic restoral and multiple central office access points.

The network supports New York Life's offices and nearly 11,000 agents. Connections to third-party service suppliers are in place, and direct customer connection is being evaluated.

New York Life's data communications network carries approximately 900,000 application transactions per day.

New York Life uses T-1 lines to connect two major IBM data centers in New Jersey and New York, carrying voice, data and two-way audio- and videoconferencing traffic. MCI's Digital Reconfiguration Service, which allows customer-controlled reconfiguration of 56K bit/sec backbones, enables the network to be fully switched from New Jersey to New York as part of a disaster recovery plan.

The company is migrating most net management functions onto a Codex Corp. 9800 network management system, but it also uses IBM's NetView. It is pilot-testing a Ku-band satellite business television net—called New York Life Network — with broadcasts emanating monthly from its in-house live studio to 21 domestic locations. These satellite broadcasts are one-way video and two-way audio, allowing for live feedback of questions.

These broadcasts include product information, selling techniques, as well as agent and staff training and educational programs. Economic reports and late-breaking news are also broadcast when appropriate. New York Life uses a variety of voice technologies, including voice mail, automatic call distribution and automated voice response.

The company plans to expand its video teleconferencing and business television capabilities in 1990 and implement worldwide electronic mail in 1990 and '91. New York Life is contemplating an Integrated Services Digital Network trial and is currently reviewing Tariff 12 and similar offerings from other carriers, electronic data interchange and voice networking options. In addition, New York Life is considering cellular and digital radio technology for future applications.

"New York Life's Emerging Technologies organization is currently prototyping several different technologies," says James Ellis, the company's vice-president of telecommunications. "Among them are intuitive systems for agents, point-of-service enabling technologies, image processing and character recognition, optical storage, trained artificial intelligence systems, multimedia systems and new channels and methods for servicing New York Life's customers."

New York Life plans to expand its video teleconferencing and business television capabilities in 1990 and implement worldwide E-mail in 1990 and '91.

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WESTINGHOUSE COMMUNICATIONS

"Business needed a telecommunications company that treated network management as a *management* problem, not just a technology issue."

—Oliver MacKinnon
Westinghouse Communications Software

Emerging technologies refers to newly evolving technologies such as image processing, executive information systems, decision support systems and knowledge-based systems, plus integration of voice. Image processing targets the mountains of paper that are an undeniable part of the insurance industry; knowledge systems shorten the processing and training cycles while increasing productivity and the level of customer service a firm can provide.

Evolving and emerging

Policy Management Systems Corp. (PMSC) of Blythwood, S.C., a vendor of insurance automation systems, demonstrated the use and integration of multiple media at its "New Directions" users conference in Columbia, S.C., in September 1988. As an example, PMSC demonstrated the processing of an auto claim.

A video showing the condition of the vehicle, with the claim adjuster's voice description, is made at a field location. The claim adjuster then submits the video to the claim processing unit. When the claim is processed for payment, this video and voice record is accessed and referenced at the claim processor's workstation during the claim adjudication process. Expert claims processing systems can then contain a combination of video and voice components.

Knowledge-based systems

In the fall of 1986, New York Life created a task force to evaluate artificial intelligence. The group also evaluated the emerging technologies of robotics, natural language (the ability to communicate with a computer by using English commands) and vision technology (the ability for the computer to "look" at an object and interpret the image). The task force concluded that the greatest potential for application development was in the expert, or knowledge-based, system arena.

Andy Hajducek, corporate vice-president for New York Life, says, "The company is currently operating or developing four or five knowledge-based systems. The task force's goal is to look for ways to impact business and the processing cycles of the business."

One of the earliest knowledge-based systems developed at New York Life tackled important customer service processing operations. In life insurance companies, policy title changes account for a large portion of processing changes.

Some requests can be easily processed on the spot, while other change requests are complicated by state regulations requiring certain forms, written authorizations and so forth. The matter is further complicated by the fact that most changes are requested in field offices, while the experts who track the state regulation requirements reside in the home office.

The knowledge base of New York Life's system contains the state regulation information necessary to process policy title changes in accordance with each state's requirements. Piloting the expert system on a personal computer, the company achieved tremendous productivity gains in the early weeks of use. Expert systems are now key to New York Life's processing strategy, providing the potential for competitive advantages in the areas of service, risk assessment and claim adjudication.

New York Life also uses expert systems in its risk assessment system for medical impairments. However, Hajducek stresses, expert systems are strictly advisory. "They do not replace the human factor. For example, a policy application would actually be reviewed by an underwriter before it is declined," he says.

This system not only assesses medical impairments, but also evaluates interactions among multiple medical impairments. "With this expert system, the sum of the parts is actually greater than the whole," Hajducek explains.

Hajducek says New York Life also uses expert systems as a training vehicle. An underwriter can query the expert system and ask why it responded in a particular way. The system will show "if" and "if, then" reasons for important consideration. Hajducek maintains that if New York Life derived no other benefit from the use of expert systems, the training aspects alone make the investment worthwhile.

Met Life is also seeing impressive results from using expert systems in employee training. Using a help desk, any employee working on one of the company's systems can seek answers to just about any question. Previously, it took two to three weeks of training to prepare a new employee to answer these basic customer telephone inquiries. The expert system help desk enables new employees to answer calls within two to three days.

Met Life has also developed an expert system for legal consultation. The system, called Checklist for Income Loan Transactions (CLINT), was developed to assist attorneys and paralegals in the closing process for commercial real estate mortgage loans. CLINT identifies the legal requirements for closing commercial real estate loans by considering the specific features of each loan.

In particular, CLINT poses questions to the user that ensure the appropriate requirements will be met. CLINT's benefits include substantial time savings in identifying legal requirements for closing loans, reduction in time spent by senior attorneys on the closing process and companywide consistency for closing checklists.

No matter what the application is, companies are finding that expert systems are paying off with big gains in productivity and consistency. Their single biggest payoff is that they also serve as a support tool.

Distributed processing is a way to handle the processing demands of several emerging technologies. By executing some processes on the personal computer and some on the mainframe and providing process-to-process communications, this architecture achieves the ease of use,

(continued on page 57)

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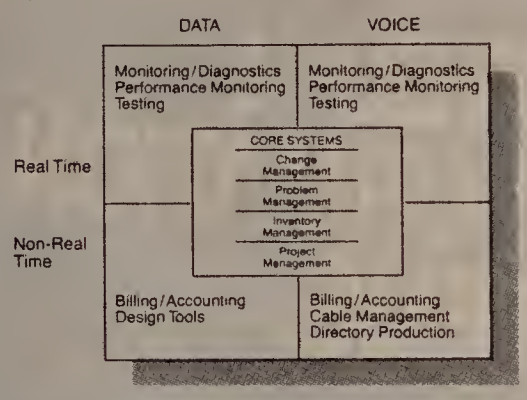

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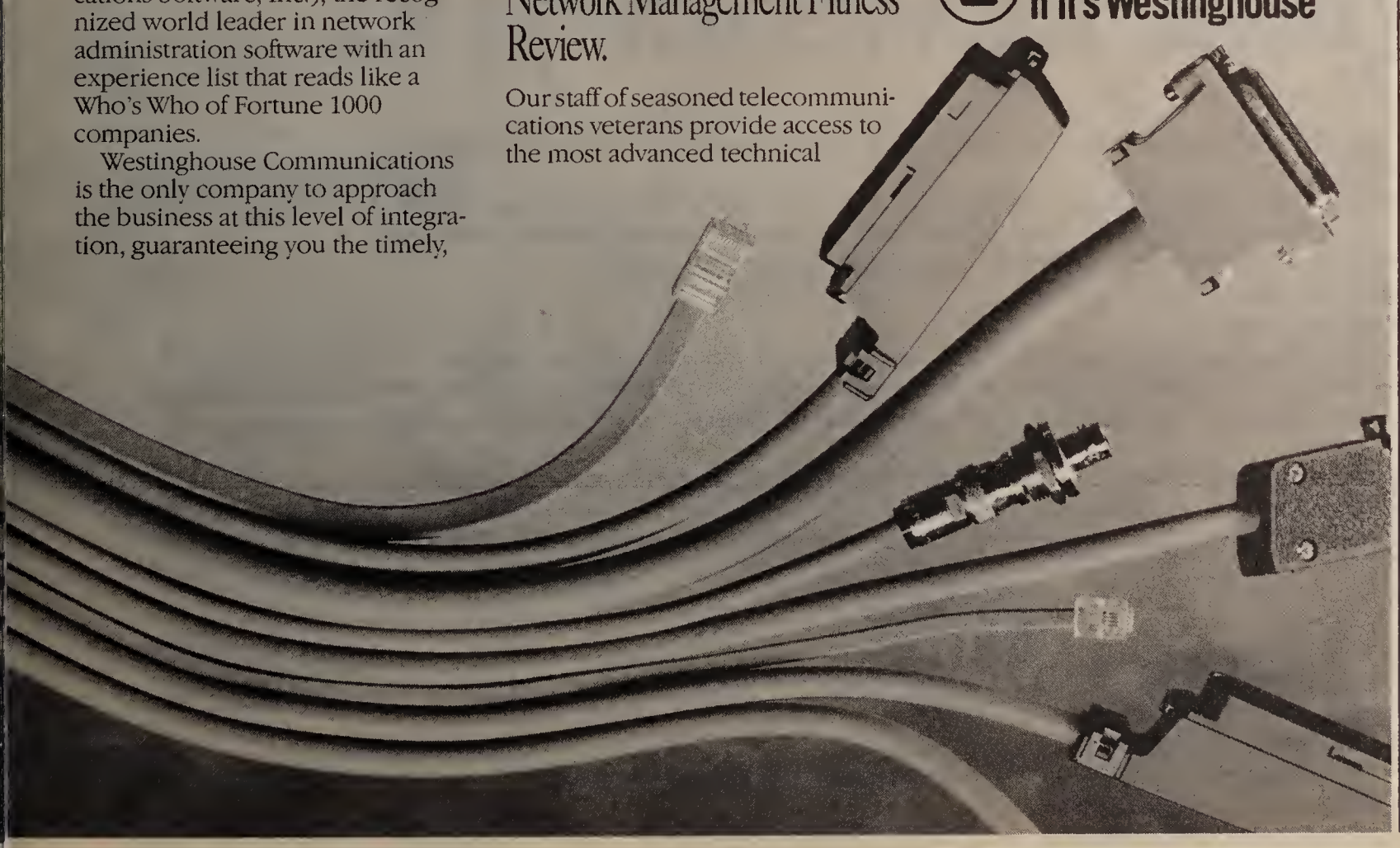

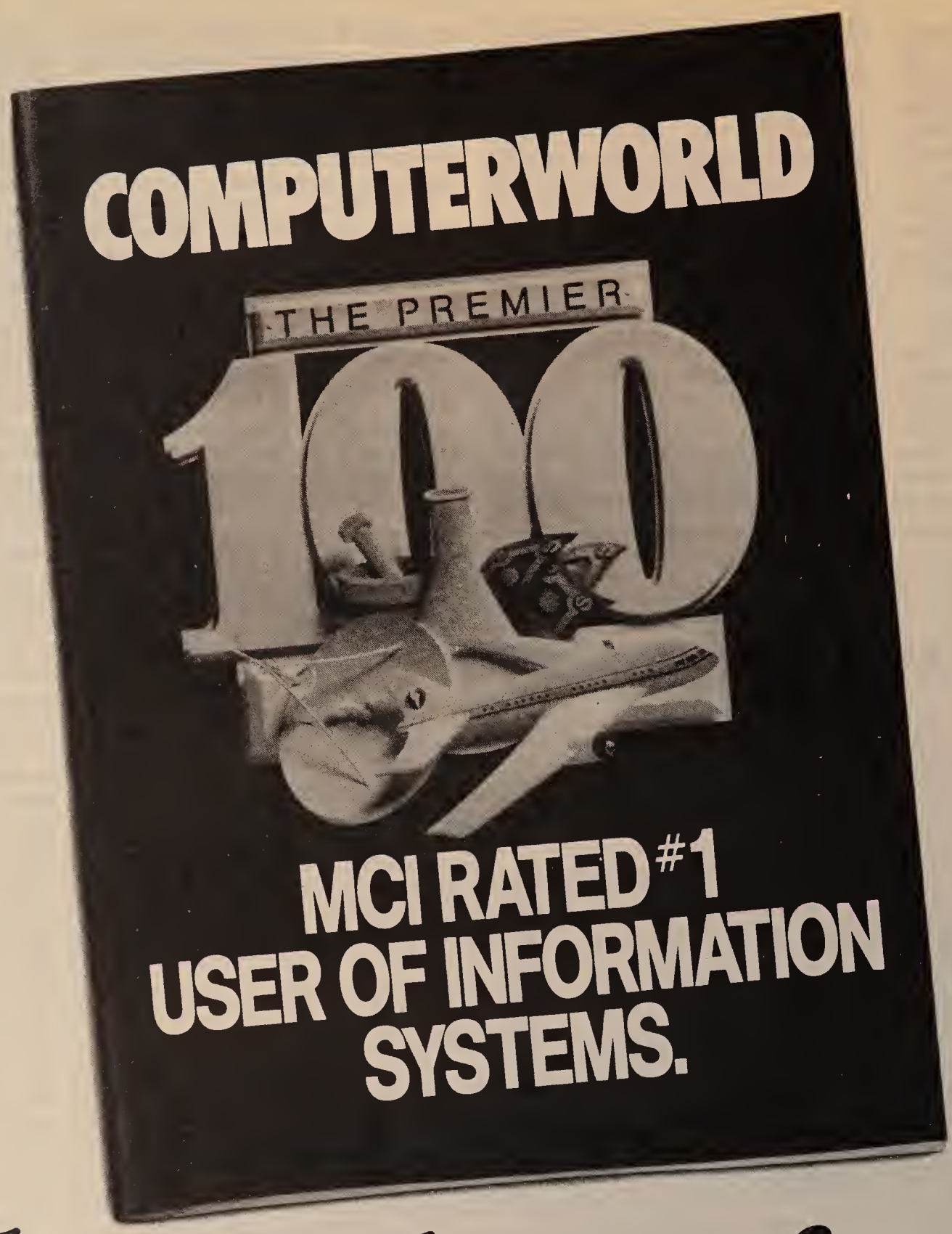

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☐ SPN Diagnostic Leased Line Modems
☐ DSU/CSU

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☐ Intelligent Chassis
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(continued from page 55)
graphics and speed of a personal computer product with the integrity, supportability and essentially unlimited size and power of a mainframe application.

This architecture supports widely scattered users, a condition that is typical at most insurance companies. Many companies are investigating, piloting and implementing image processing applications; all are looking to solve the burden and cost of manually dealing with truckloads of paper each year. With 95% of the insurance information on paper, the Life Office Management Association, an Atlanta-based organization that tracks life insurance industry statistics, estimates the U.S. insurance industry spent more than $6 billion on system technology development in 1988.

Image processing

Federated Insurance Co. of Owatonna, Minn., handles commercial and personal lines and has a staff of more than 2,000 in the U.S. and Canada. The company nearly doubled its commercial sales from 1984 to 1985, when more than 5,000 accounts and 20,000 policies were added. Similar growth occurred in Federated's personal lines; total assets were more than $850 million, heading rapidly toward $1 billion.

But with the company's growth came headaches. Account files and policy assembly areas were outgrowing the existing headquarters. Personnel were constantly being hired to handle the increased work load, and their training was often difficult and time-consuming. Federated receives as many as 250,000 Certificate of Insurance requests a year. Processing often meant that six copies of the certificate had to be routed, mailed and stored, and it often took as long as a week to complete the process.

When Federated began using Metafile, Inc.'s Metaview cooperative processing system, it experienced immediate benefits: Certificate preparation productivity tripled, paperwork was reduced, the paper processing cycle was shortened, and one host could support more workstations and applications. With Metaview, data is accessed and updated directly at the host; no downloading, uploading or file conversion is required.

Also, documents can be printed at workstations rather than centrally at the host site. Gary Tobiason, Federated's vice-president of information systems, says, "With the Metaview architecture, the entire information network appears as one computer dedicated to a local user's needs. That includes local data, host data, printer, personal computers and mainframe."

Northwestern Mutual Life Insurance Co. of Milwaukee is also committed to cooperative processing and uses the Metafile products. Arman Gummerman, the company's director of information systems, says, "The Metaview workstation is outstanding for use in integration and interconnection. Metafile specializes in integration — that's its strength."

One key advantage of image processing technology is the space saved in record storage. For example, when compressed, 10,000 8½-by-11 in. pages will fit on one 5¼-in. optical disk. Three full, four-drawer file cabinets containing approximately 68,000 pages will fill one 12-in. optical disk platter. An optical disk jukebox — which functions similarly to a music jukebox, with drive arms selecting disks instead of records — that physically consumes a space of 3 ft.-by-2 ft.-by-1½ ft. and contains 25 disks will replace about 140 four-drawer file cabinets.

Looking ahead

Corporate networks are now being driven by business-critical data applications. Gartner Group, Inc., a market research firm based in Stamford, Conn., predicts that by 1993, 70% of the private network backbones will carry integrated voice, data and image traffic, encouraging the development of better integration methods in transmission, equipment and management.

To satisfy corporate and customer appetites for faster, more viable information, insurance companies of the 21st century must provide enterprisewide networks of knowledge. The menu must include all necessary and appropriate information for training, marketing, sales and, most importantly, service to the client — available to anyone, anywhere, at any time.

The network will be the focus of integration, including mainframe, microcomputers and terminals, in cooperative processing networks. Training and support of agents will be easier because they will be able to access the major sources of product, sales, marketing and operational information through the network. As the competitive landscape changes, insurance companies that have carefully prepared for the future will emerge as winners.

To get information on products or services advertised in this week's issue of *Network World*, see the FAXNeT Form on Page 91

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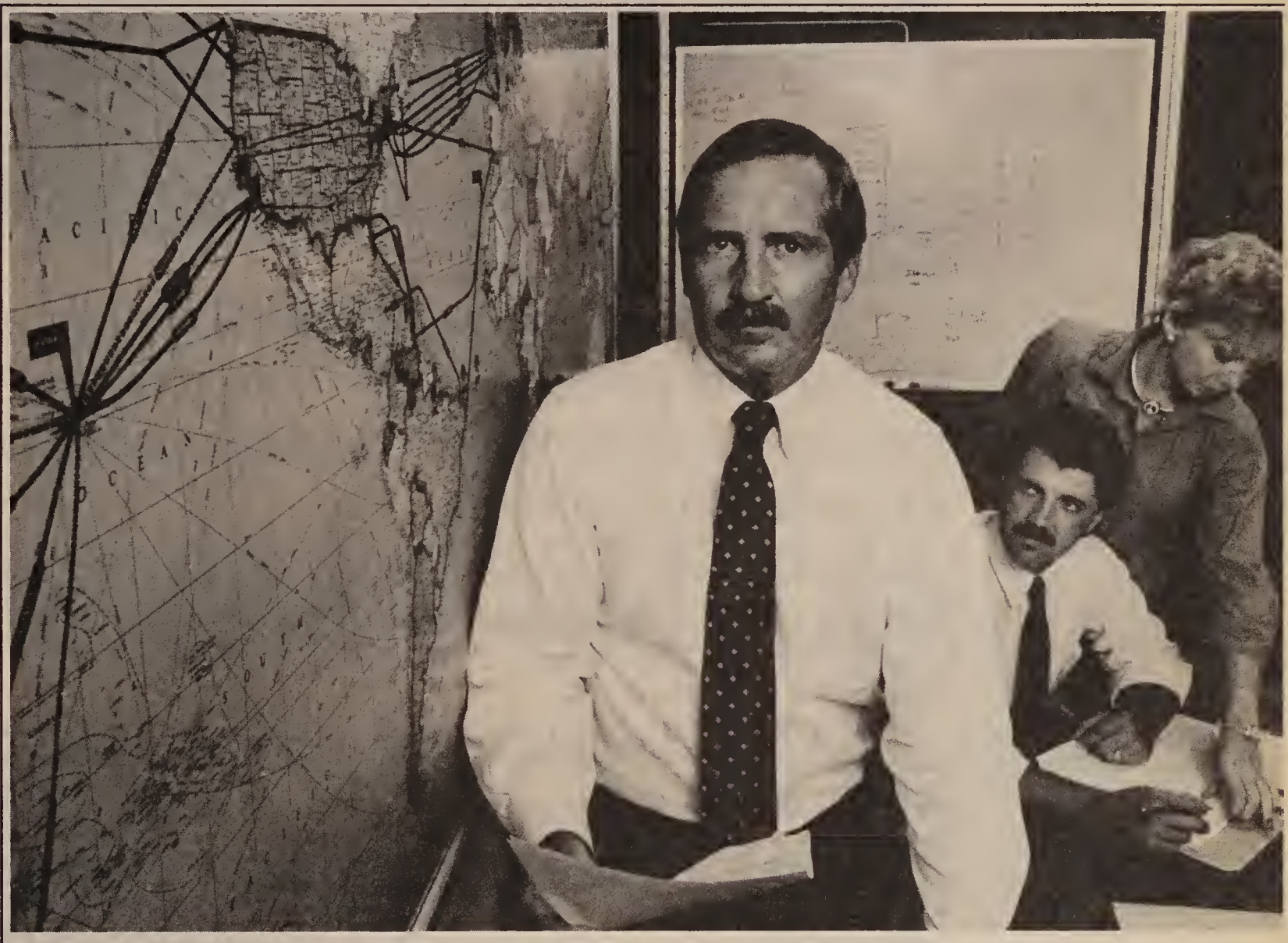

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See the FAXNET Form on Page 75

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CONTINUED FROM PAGE 1
net is its lack of fault-tolerant networking when a ring configuration is used. In short, if a node or backbone in the ring fails, so does the network.

That drawback has been eliminated by at least one vendor — Artisoft, Inc. — whose LANtastic product can be configured with a dual backbone. And a solution to link and node failure comes, oddly enough, from FiberCom, Inc., an FDDI proponent. FiberCom offers a product that allows dual counter rotating ring networks to be established on Ethernet, thus furnishing the integrity that token-ring users enjoy.

Performance issues

By now, most communications professionals are probably weary of hearing about the performance problems wrought by Ethernet's carrier-sense multiple access with collision detection nondeterministic access method. As the story goes, when more users enter the network, the frequency of packet collisions increases.

Some experts claim that with 20% loading, the packet collisions will be so frequent that throughput will be severely degraded. However, the degree of degradation depends on the size of the network and packets being transmitted; the larger the packet size, the more likely collisions will be frequent.

Of course, what constitutes too frequent collisions is a matter of opinion. Tom Brisco, a net-

(continued on page 62)

CHART • GUIDE

A *Network World* Buyer's Guide chart listing the features of a variety of Ethernet local-area networks begins on page 60.

Hunter is president of TMS Corp., a telecommunications consulting firm in Wayne, Pa.

By JOHN HUNTER

Ethernet local networks (continued on page 63)

Vendor	Product	LAN type	Ethernet version supported	Backbone medium	Backbone speed (bit/sec)	Redundant backbone	Type of PC interfaced	LAN OS supported	LAN access security	Protocols supported	Bridges offered	Gateways offered	LAN management facilities	Price*
Applitek Corp. Wakefield, Mass. (617) 246-4500	CS 410 Network Processor Board	Baseband	IEEE 802.3	Coaxial, TP	10M	Yes	Any	CPNX	Password, port address	TCP/IP, Transport Protocol 4, CPNX	NA	X.25, SNA, Unisys Corp., Honeywell, Inc., NCR Corp.	Port, node, device and line monitoring	$6,000 to $10,000
Artel Communications Corp. Hudson, Mass. (617) 752-5690	FiberWay	Baseband	IEEE 802.3	Fiber optic	10M	Yes	IBM Personal Computer XT, AT	NetServer	Password	All supported by IEEE 802.3	None	None	None	$48,000 for transceivers only
Artisoft, Inc. Tucson, Ariz. (602) 293-6363	LANtastic Ethernet LAN	Baseband	IEEE 802.3	Coaxial	10M	Yes	Personal Computer XT, AT, IBM Personal System/2 trol lists	LANtastic	Two levels of passwords, access con	LANtastic	None	None	Checks adapter operation	$10,945 (does not include transceivers)
AT&T Morristown, N.J. (201) 221-2000	Starlan 10 Network	Baseband	IEEE 802.3, 10BaseT draft	UTP, fiber optic, coaxial	10M	No	Personal Computer XT, AT, Personal System/2, AT&T 3B2	AT&T StarGroup, NetWare, VINES	Logon names, shared devices, password (with StarGroup); others depend on OS	TCP/IP, OSI	Ethernet to Ethernet, Token Ring or Starlan	SNA, X.25, TCP/IP, asynchronous, remote PC	Line status, node monitoring, fault isolation, alarms, critical errors, reports generation via Starlan Network Manager	$22,830
Banyan Systems, Inc. Westborough, Mass. (508) 898-1000	VINES	Baseband, broadband	IEEE 802.3	Thick and thin Ethernet, coaxial, TP, UTP, fiber optic	10M	Yes	Personal Computer XT, AT, Personal System/2; Compaq Computer Corp. Deskpro 386; Wang Laboratories, Inc. 380, 381, 382; Intel Corp. 301/302; Grid Systems Corp. GridDesk 386/20; Zenith 386; Ing. C. Olivetti & Co., S.p.A. M380, XPI, XP3, XP5	VINES	Password, access rights list	XNS, TCP/IP, X.25, SNA	Ethernet to Ethernet, token ring, Arcnet, Starlan or VistaLAN	X.25, SNA, TCP/IP, E-Mail, Macintosh	NA	$995 to $4,995 per server for VINES software only; no hardware sold
ChipCom Corp. Waltham, Mass. (617) 890-6844	ORnet/PC Fiber Adapter Card	Baseband	IEEE 802.3, Version 2	Fiber optic	10M	Yes	Personal Computer XT, AT	Advanced NetWare, NETBIOS, 3+Open, 3+, OS/2 Extended Edition	Depends on OS	TCP/IP, PC/NFS,?? DECnet	None	None	NA	$15,900
Codenoll Technology Corp. Yonkers, N.Y. (914) 965-6300	Codenet Fiber Optic Ethernet LAN	Baseband	IEEE 802.3, Version 2	Fiber optic	10M	Yes	Depends on adapter used	Any	Depends on OS	Transparent	None	None	None	$35,300 for PC adapter cards, cable, passive star coupler, base unit, Codestar units
Cogent Data Technology, Inc. Friday Harbor, Wash. (206) 378-2929	E/Master	Baseband	IEEE 802.3	Coaxial	10M	NA	Personal Computer AT	LAN Manager 286	Password	Network Drivers Interface Specification, NETBIOS	NA	None	Same as LAN Manager	$20,850
Communication Machinery Corp. Santa Barbara, Calif. (805) 963-9471	OpenWare	Baseband	IEEE 802.3, Versions 1 and 2	Thick and thin coaxial	10M	No	Personal Computer XT, AT, Personal System/2, VAX, Unix workstations	NFS, NetWare, MS-Net, 10Net, Tapestry	Depends on OS used	TCP/IP, OSI	None	X.25 router	SNMP	$16,000
David Systems, Inc. Sunnyvale, Calif. (408) 720-8000	David Information Manager	Baseband	IEEE 802.3	TP	10M	No	Personal Computer XT, AT, Personal System/2	VINES, NetWare, 3+	Port address, class of service	Transparent	None	T-1	Transceiver loopback, packet statistics, performance and error rates, enable/disable any system element	$22,650
DCA/10NET Communications Dayton, Ohio (513) 433-2238	10NET Plus	Baseband	IEEE 802.3	Coaxial, TP, UTP, fiber optic	10M	No	Personal Computer XT, AT, Personal System/2	10NET	Password, directory security, file security	TCP/IP, NETBIOS, SMB	Ethernet to token ring	SNA, TCP/IP, T-1, X.25	Link status, server resource monitoring	$14,000 for TP version; $20,000 for coaxial version
Digital Equipment Corp. Littleton, Mass. (508) 897-5111	DECnet PCSA	Baseband	IEEE 802.3, Version 2	Coaxial, fiber optic	10M	Via Spanning Tree bridges	DECstation PCs; Personal Computers XT, AT, Personal System/2	DECnet	Password, node address, node name	Digital Network Architecture, SNA, TCP/IP, X.25	Ethernet to IEEE 802.3	SNA, X.25	Display operating statistics and error information, shows DECnet node configuration, tests LAN component through DECnet Network Control Program	$18,850
DSC Communications Corp. Campbell, Calif. (214) 519-3000	DSC NEXOS	Baseband	IEEE 802.3	Coaxial	10M	No	Personal Computer XT, AT, Personal System/2	DSC NEXOS	Password, system security log, real-time security monitor	TCP/IP, NETBIOS	None	X.25, SNA	Disk utilization, print jobs and queues, network requests, on-line and off-line resource status	$15,145
Farallon Computing, Inc. Berkeley, Calif. (415) 849-2331	Star-Controller EN	Baseband	IEEE 802.3, Version 2	UTP	200K (for Apple); 10M	Yes	Macintosh	Any Ethernet and AppleTalk	Depends on OS	NA	None	None	Monitors collisions and traffic, jabber warning, access restrictions based on individual ports	$31,470 (does not include LAN OS)
FiberCom, Inc. Roanoke, Va. (703) 342-6700	Whisper-LAN	Baseband	IEEE 802.3 or Version 2	Fiber optic	10M	Yes	Depends on adapter card	Any	Depends on OS	Transparent	Ethernet to Ethernet	None	Monitors cable for breaks	$28,000 for transceivers only
Gateway Communications, Inc. Irvine, Calif. (714) 553-1555	G/Ethernet WS	Baseband	IEEE 802.3, Version 2	Coaxial	10M	No	Personal Computer XT, AT, Personal System/2	NetWare, LAN Manager, 3+	Depends on OS	IPX, NETBIOS, TCP/IP	None	X.25, SNA, asynchronous	None	$10,350
	G/Ethernet MC	Baseband	IEEE 802.3, Version 2	Coaxial	10M	No	Personal Computer XT, AT, Personal System/2	NetWare, LAN Manager, 3+	Depends on OS	IPX, NETBIOS, TCP/IP	None	X.25, SNA, asynchronous	None	$15,750

CPNX = Applitek operating system
IPX = Internetwork Packet Exchange
LAN Manager = Microsoft Corp. LAN operating system
LANtastic = Artisoft operating system
NA = Information not available
NetServer = Artel operating system
NFS = Network File System
SMB = Server Message Block
SNMP = Simple Network Management Protocol
3+ = 3Com operating system
3+Open = 3Com operating system
TP = Twisted pair
UTP = Unshielded twisted pair

*Prices shown are for 30 personal computer interface cards, transceivers, connector cable and LAN OS unless otherwise noted.

This chart includes a representative selection of vendors in the Ethernet local net market. Most vendors offer other Ethernet LANs, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., DEVON, PA.

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(continued from page 59)
work systems programmer with Rutgers-The State University in Piscataway, N.J., states that the school's Ethernet network experiences "a 7% collision rate at 40% loading with large packets." According to Brisco, the 40% loading occurs during peak hours, when students, faculty and researchers are active and many are transferring files.

Collisions drop appreciably as the network load is halved, however. "At 15% to 20% [loading], we get no more than 1% collisions," Brisco said. Rutgers has about 60 to 70 individual networks active in a triangle consisting of drop sites in Piscataway, New Brunswick and Princeton, N.J.

Solutions for reducing collisions, such as segmenting the network to make it smaller, abound. NetWorth, Inc. of Irving, Texas, has a different idea with its relatively new EtherneXt local-area network. EtherneXt uses CSMA with collision elimination.

> IEEE 10BaseT also looms on the horizon for Ethernet shoppers. While not officially approved, some vendors feel confident enough to have announced support for it.
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According to NetWorth, a proprietary algorithm senses when packets are on a collision course, temporarily blocks one packet and allows the other to pass.

EtherneXt uses a star configuration that employs proprietary intelligent concentrators and transceivers. Each concentrator controls as many as 11 nodes. According to Ahmad Noury, NetWorth's director of hardware engineering, CSMA/CE prevents packet collisions only when two nodes are attempting simultaneous transmission; three or more simultaneous transmissions result in all but one packet being lost.

CSMA/CE can be retrofitted to existing Ethernet LANs by adding the intelligent concentrator, which costs $2,495, and equipping each node with a combination personal computer and transceiver interface card, which costs $495 for eight-bit and $595 for 16-bit units.

Different strokes

Recently, some changes have been made to basic Ethernet cabling plants. Early Ethernet backbones used coaxial cable to carry data at speeds of 10M bit/sec, but a few years ago, companies such as SynOptics Communications, Inc. began offering twisted-pair wiring in lieu of coaxial cable.

Then there are products such as AT&T's Starlan, which uses twisted pair but only supports 1M bit/sec transmission speeds. Such networks are fine for applications that do not require large bandwidth, such as interactive applications, but people began complaining about poor performance once heavy loads, such as file transfers, were applied. Those criticisms haven't been wasted on AT&T, which now offers 10M bit/sec with its Starlan 10 network.

The IEEE 10BaseT recommendation also looms on the horizon for Ethernet shoppers. While not officially approved by the 802.3 Technical Committee on Computer Communications, some vendors feel confident enough with the state of the current recommendation to have announced support for it (see chart beginning on page 60).

The 10BaseT recommendation will permit 10M bit/sec to be transmitted over 24-pair unshielded twisted-pair wiring. The transmission speed itself is no big deal since a number of unshielded twisted-pair wiring plants are now available to do that. But 10BaseT will furnish something badly needed: network compatibility.

"10BaseT provides a standard so vendors' [networks] will interoperate," says Frank Fuller, senior product manager for ChipCom Corp.'s fiber-optic product line. Fuller notes that current unshielded twisted-pair LANs are proprietary and don't interoperate. "They won't operate with 10BaseT either, so in a sense, they'll be obsolete as far as [heterogeneous equipment] networking is concerned," he contends.

Bob Campbell, a technical staff member with AT&T's Middletown, N.J., facility and a member of the 802.3 Technical Committee on Computer Communications, agrees that a standard will increase connectivity and cites other advantages of 10BaseT over existing unshielded twisted-pair technology.

"The signal-to-noise rejection [ratio] is better with 10BaseT, and it employs the 'keep alive' signal when no data is being sent," Campbell says. "10BaseT also has better transmit equalization [than current unshielded twisted-pair technology], and it isn't [susceptible] to the 100-meter intersymbol interference problem."

The cabling plant of 10BaseT is also different. It calls for 25-pair cable (vs. four-pair for unshielded twisted pair); therefore, 12 circuits can be established on each bundle.

And, contrary to rumors circulating that 10BaseT requires special adapters at the wall and wire closet that cost anywhere from $300 to $1,000 each, 10BaseT works with standard IEEE 802.3 Ethernet interfaces and eight-pin modular jacks, such as the ones business telephones use, according to Campbell.

Marvin Chartoff, a senior manager with the Network Strategies consultancy of

(continued on page 64)

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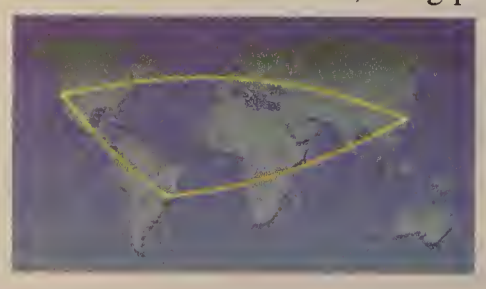

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See the FAXNeT Form on Page #91

Ethernet local networks (continued from page 60)

Vendor	Product	LAN type	Ethernet version supported	Backbone medium	Backbone speed (bit/sec)	Redundant backbone	Type of PC interfaced	LAN OS supported	LAN access security	Protocols supported	Bridges offered	Gateways offered	LAN management facilities	Price*
Hewlett-Packard Co. Cupertino, Calif. (408) 725-8900	HP AdvanceNet	Baseband, broadband	IEEE 802.3, 10BaseT draft, Version 2	Thin or thick coaxial, TP, UTP, fiber optic	10M	Yes	Personal Computer XT, AT, Personal System/2 Micro Channel	HP LAN Manager, HP Office-Share, 3+Open, NetWare	Password, port address	TCP/IP, NBP, DLC, XNS	Starlan 10 to Ethernet, Ethernet to token ring, Ethernet to Ethernet	SNA	Local and remote loop-back, component self-check, exception reporting, transaction logging and tracking, LAN analyzer	$21,425
Hughes LAN Systems, Inc. Mountain View, Calif. (415) 966-7400	LocalNet 4000	Baseband	IEEE 802.3	Coaxial, TP, UTP	10M	Yes	Personal Computer XT, AT, Personal System/2	NetWare	Same as NetWare	TCP/IP, DLP	Ethernet to Ethernet, token ring, Broadband, T-1	None	Node analysis, packet and socket utilization, diagnostics	$12,700
ICE Corp. Scottsdale, Ariz. (602) 998-9780	ICE-IIE	Baseband	IEEE 802.3	Thick coaxial	10M	No	Personal Computer AT, Personal System/2 Models 25 and 30	Netware, NETBIOS, CBIS Corp.'s Network O/S	Depends on OS	NA	None	None	NA	$11,500
Invisible Software Foster City, Calif. (415) 570-5967	Invisible Ethernet	Baseband	IEEE 802.3	Thin coaxial	10M	No	Personal Computer XT, AT, Personal System/2	NET/30, NetWare, IBM PC LAN	Password, user and group definitions, access rights	NETBIOS	None	None	Hardware status monitoring	$12,560
Network Systems Corp. Minneapolis, Minn. (612) 424-4888	LAN II	Baseband	IEEE 802.3, Version 2	Coaxial, TP, fiber optic	10M	Yes	Personal Computer XT, AT, Personal System/2	NetWare, 3+, VINES, Sun Microsys-tems, Inc. OS	NA	TCP/IP, XNS, X.25, DECnet	Ethernet to Ethernet, token ring, X.25	T-1, T-3, X.25, fractional T-1	SNMP, T-1, data service unit/channel service unit monitoring and control	$28,100 (includes NetWare OS)
Networth, Inc. Allen, Texas (214) 869-1331	EtherneXt	Baseband	IEEE 802.3	Coaxial, UTP, fiber optic	10M	No	Personal Computer XT, AT, Personal System/2, Micro Channel	NetWare	Same as NetWare	No	No	None	Net statistics, node isolation	$24,830 for transceivers and net concentra-tors only
Novell, Inc. Provo, Utah (801) 379-5900	NE/2-32 Ethernet Adapter	Baseband	IEEE 802.3, Version 2	Thin or thick Ethernet, fiber optic, TP	10M	Yes	Personal System/2 Models 70 and 80 (32-bit Micro Channel)	NetWare 386 Version 3.0	File, directory and user words; group, time of day and server restrictions	TCP/IP, Apple File Protocol, NFS, SMB	Ethernet to Arcnet, token ring, PC Network II	X.25, SNA, asynchro-nous	Monitors for number of packets sent/received, block count, collisions, CRC errors, too large or small packets, packet receive overflow, dynamic memory	$23,345 (includes NetWare 386)
Racal Interlan Boxborough, Mass. (508) 263-9929	TCP/IP for OS/2 LAN Manager	Baseband	IEEE 802.3	Coaxial, UTP	10M	Yes	Personal Computer XT, AT, all models Personal System/2	3+Open, LAN Server, Racal Interlan LAN Manager, all versions of LAN Manager	Depends on OS	TCP/IP, NETBEUI, DLC, IPX, Sequenced Packet Exchange	None	None	Same as LAN Manager	$16,000
Siecor Corp. Electro-Optic Products Division Research Triangle Park, N.C. (919) 481-5100	LAN One Plus Ethernet	Baseband	IEEE 802.3, Version 2	Coaxial, fiber optic, UTP	10M	No	Depends on PC adapter used	Depends on adapter card	Depends on OS	Trans-parent	None	None	Line failure, transmit/ receive errors per port, packet collision reporting	$4,470 for coaxial transceivers; $19,800 for fiber-optic transceivers; does not include PC adapter cards or OS
SynOptics Communications, Inc. Mountain View, Calif. (415) 960-1100	LattisNet	Baseband	IEEE 802.3	UTP, TP, fiber optic	10M	Yes	Depends on adapter card	Any	Password to management station	Trans-parent	Ethernet to Ethernet	None	Graphics-based (windows) management system	$11,500 (does not include PC adapter cards or OS)
3Com Corp. Santa Clara, Calif. (408) 562-6400	3+Open	Baseband	IEEE 802.3	Coaxial, TP, UTP	10M	NA	Personal Computer XT, AT, Personal System/2, Macintosh	3+	Password	TCP/IP, XNS, NBP, OSI, DLC	None	None	Monitors line status and ports	$15,345
Ungermann-Bass, Inc. Santa Clara, Calif. (408) 496-0111	Net/One	Baseband or broadband	IEEE 802.3, Version 2	Coaxial, UTP	10M; 5M per channel for broadband	Yes	Personal Computer XT, AT, Personal System/2	NetWare, LAN Manager, PC-LAN, LAN Server	Port and user password, event logging, server operation validation, user authentica-tion, port and resource access control	XNS, TCP/IP	Ethernet to local or remote Ethernet, token ring or Fiber Distributed Data Interface	X.25, IBM 3270 coaxial	Fault isolation and recovery, traffic and performance statistics to port level, connection statistics log, event log, central configuration download, line monitoring	$17,145
Versitron Systems Engineering Annapolis Junction, Md. (301) 497-8600	Fiber Optic Bus Transceiver	Baseband	IEEE 802.3, Version 2	Fiber optic	10M	No	Depends on controller card used	Any supporting Ethernet	Depends on OS	NA	None	None	None	$24,600 for transceivers only
Zenith Electronics Corp. Glenview, Ill. (312) 391-7000	Z-LAN 10E	Baseband	IEEE 802.3	Thin or thick Ethernet	10M	No	Personal Computer XT, AT, Personal System/2, all Intel 80386-based units	NetWare, 3+, LAN Manager	Depends on OS	TCP/IP, OSI	None	X.25, SNA, T-1	None	$11,850 for PC interface cards and LAN OS drivers

DLC = Data Link Control
IPX = Internetwork Packet Exchange
LAN Manager = Microsoft Corp. LAN operating system
LAN Server = IBM LAN operating system
LANtastic = Artisoft operating system
NA = Information not available
NBP = Name Binding Protocol
NETBEUI = NETBIOS Extended User Interface
NFS = Network File System
SMB = Server Message Block
SNMP = Simple Network Management Protocol
3+ = 3Com operating system
3+Open = 3Com operating system
TP = Twisted pair
UTP = Unshielded twisted pair
XNS = Xerox Corp.'s Xerox Network System

*Prices shown are for 30 personal computer interface cards, transceivers, connector cable and LAN OS unless otherwise noted.

This chart includes a representative selection of vendors in the Ethernet local net market. Most vendors offer other Ethernet LANs, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., DEVON, PA.

(continued from page 62)
Ernst & Young in Fairfax, Va., agrees that 10BaseT will enhance the chances of interconnectivity but doesn't necessarily guarantee it. "As with any recommendation, vendors strive for some value-added features to keep their products from becoming a commodity. While it's likely that the difference will be in network management, it would be smart to test those LANs very carefully to be sure that nothing else has changed," he cautions.

Fault tolerance

Fiber-optic cable is also no stranger to Ethernet LANs, but the use of FDDI counterrotating rings to attain fault tolerance is new. As noted earlier, a node failure or a cable break in an Ethernet ring configuration has disastrous effects unless the problem area can be bypassed. That's what FDDI permits with token-ring LANs, and FiberCom is offering the same facility to Ethernet users.

With FDDI, the net architect establishes a secondary backup link on the same fiber-optic backbone that transmits data counterclockwise to the primary path ("Praise the LAN and pass the tokens," *NW,* April 25, 1988). FDDI provides every node with what amounts to an optical bypass switch that automatically removes a failed node from the network. As many as three sequential nodes can be bypassed, and the network will still maintain enough optical power to permit operations to continue. If the primary fiber-optic backbone fails, the media interface units at the stations on either side of the failure automatically loop the data over the secondary backbone.

> "Vendors strive for some value-added features to keep their products from becoming a commodity."
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FiberCom's WhisperLAN provides such fault-tolerance for Ethernet LANs. With WhisperLAN, each node is fitted with a dual-path transceiver that senses a node or backbone failure and automatically initiates the node bypass or data loop-around operation. Rutgers' network operating in the New Brunswick-Piscataway-Princeton triangle uses that configuration. According to Rutgers' Brisco, about 60 to 70 networks are involved, so data bandwidth and backbone integrity are vital.

"The fiber gives us all the bandwidth we need, and we did have a failure that caused the redundant backbone to kick in. It was so automatic, we didn't realize at first that the primary had failed," Brisco says.

Such peace of mind has its price, however. FDDI controller cards cost between $7,000 and $10,000 each, although Selby Wellman, FiberCom's corporate vice-president of sales and marketing, predicts that the prices will drop to $1,500 by 1992. For users planning on networking FDDI backbones, prices of $40,000 to $60,000 have been mentioned for routers and bridges by several people interviewed. Those numbers, however, are bound to drop.

> "The initial cost of any new technology is high, and the [users] in on the ground floor are paying for it," Fuller states.
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"The initial cost of any new technology is high, and the [users] in on the ground floor are paying for it," ChipCom's Fuller states. Like everyone else, he says he sees the prices coming down as more companies enter the FDDI component marketplace and as the technology improves.

Since fiber cable can be configured with many independent channels, it is possible to run different LANs over the same backbone. Rutgers is moving in that direction. "We have four [fiber] strands reserved for FDDI [token ring], and we have two for Ethernet. That way we can run both on the same backbone," Brisco says.

If FDDI is priced too high for the budget, Artisoft allows multiple media access unit cards — each priced at $349 — to be configured on its LANtastic product, enabling redundant backbones to be configured. "Those [backbones] can be in a star or redundant coaxial cable configuration, but both [backbones] are always working," states Alex Karahalios, Artisoft's vice-president of engineering. Switch-over, however, is not transparent; the user has to enter keyboard commands to log off the broken backbone.

Some users may bypass FDDI and the Artisoft solution, and use the more traditional scheme of dual-star clusters and backbones. While that solves the node and link failure problems, star controllers and additional cable are not inexpensive; peace of mind rarely comes cheap.

Most LANs are geared to handle eight- or 16-bit workstations, which have been the industry standard for years. That's

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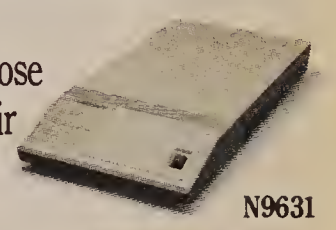
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changing though, now that newer 32-bit microprocessors are available. The difference in performance in just the data transfer rates with the new machines is quite notable: A 20-MHz machine can transfer a 16-bit word in 200 nsec, while only 300 nsec is required to transfer a 32-bit word.

The recently announced NCR 92C28 LAN controller is a good example of a product geared for host- and LAN-interfaced 16- and 32-bit applications. It handles 16- and 32-bit data transfers, has a 16-bit internal architecture and supports IBM Personal Computer AT, Micro Channel and Extended Industry Standard Architecture interfaces. It uses two independent first-in, first-out (FIFO) buffers and offers as much as 128K or 256K bytes of random-access memory for 16- and 32-bit modes, respectively. It also supports bus master data transfers to and from the transmit and receive FIFO buffers. When a 32-bit external bus is used, the NCR 92C28 multiplexes data to the internal 16-bit bus.

The NCR 92C28 transmit/receive buffer capacity can be set to enhance overall performance by causing the workstation's microprocessor to be interrupted less frequently to empty the buffers. On the receive buffer, the capacity can be set for two, four, eight or 12 words, and the transmit buffer will accommodate four, eight, 12 or 14 words.

LAN management

As LANs get larger, managing them becomes a critical issue. Network managers want to know when service outages occurred and what caused them. They also need performance statistics to determine past usage and predict future demands. In addition, alarms and indicators that warn when potentially serious problems have occurred, or are about to occur, are ideal.

> "It's possible to isolate a jabbering node, but you'll need an intelligent hub or repeater to do it."
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For example, the file server is a critical component in most LANs, so net managers need to know when disk capacity is about to drop below a critical point. That information can come from management reports, or an audible alarm can be sounded.

Managing the use of resources is also important. Some system usage reports, for example, show the number of files and directories declared on an individual basis, as well as the frequency of file activity. The latter identifies which files are "parked," or infrequently used, on the server, thereby denying disk space to other files.

Some vendors also claim the ability to disconnect faulty nodes from the network, but many systems can accomplish that only with vendor-specific products or through the use of rather expensive hubs or repeaters.

"It's possible to isolate a jabbering node, but you'll need an intelligent hub or repeater to do it," says Ray Huai, director of engineering for Cheyenne Software, Inc., a Roslyn, N.Y., software development company that sells systems to enhance Novell, Inc.'s NetWare 2.1 diagnostic protocol.

Security is another issue. Just about all LANs offer some form of user password that permits entry into the network, but from there on, security is spotty. As the chart shows, a few vendors limit user access to certain resources and others restrict the actions that can be performed. Such security can be enforced on a node-by-node basis, while others use security access tables, which associate users with resources and actions permitted.

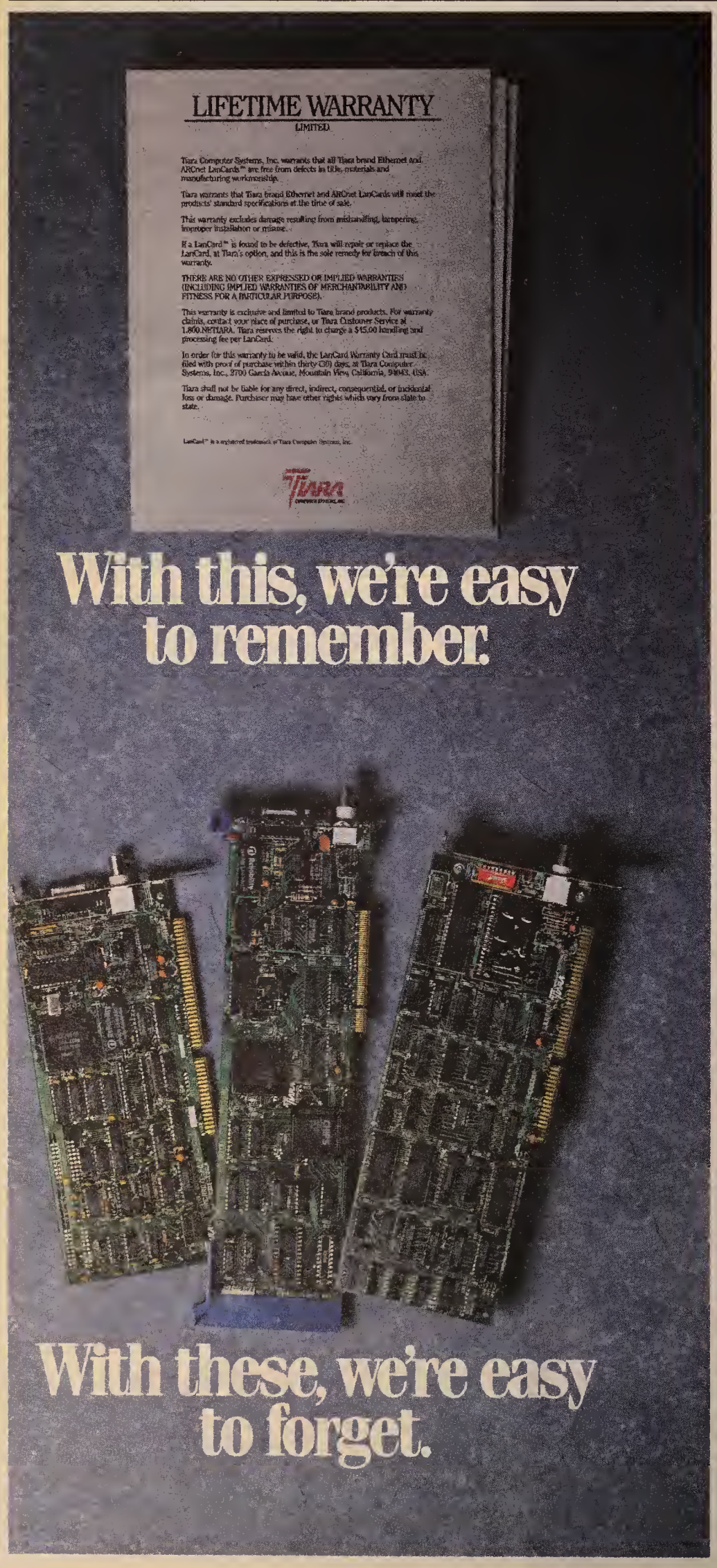
Summary

Many industry pundits believe that the Ethernet market is in a holding pattern and will soon be surpassed by 16M bit/sec token ring and 100M bit/sec FDDI. Aside from the higher bandwidths, the deterministic network access method associated with token passing is said to be more efficient than the free-for-all CSMA/CD method.

But for many applications, bandwidth is not an issue. Interactive transactions not involving large file transfers can get by nicely with a 1M bit/sec Starlan, for example. Also, there's no reason why Ethernet and token-ring LANs can't coexist now that token-ring-to-Ethernet bridges are available from Hewlett-Packard Co. and Ungermann-Bass, Inc.

Ethernet will get a badly needed lift once the 10BaseT standard is finally approved, but "don't expect [that to] happen before next July at the earliest," AT&T's Campbell says. "The technical specs are all wrapped up, but there are wording issues to be resolved. [The 802.3 Technical Committee on Computer Communications] also wants to be sure that we conform with the work being done by the [Electronic Industries Association] 41.8 committee, which is writing specifications on what type of wiring should be used in new buildings."

Unshielded twisted-pair wiring provides a cost edge many LAN vendors need, and the 10BaseT standard will permit disparate products to interoperate. The losers will be companies that don't buy into 10BaseT; they'll be marooned on their own proprietary islands.



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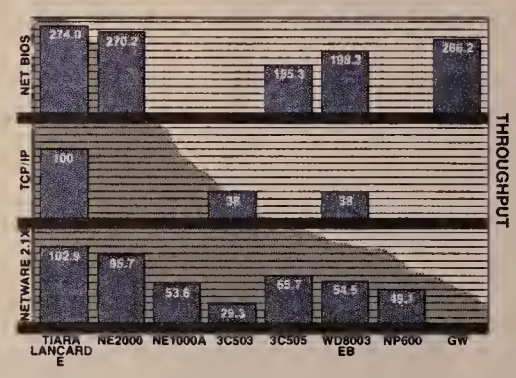

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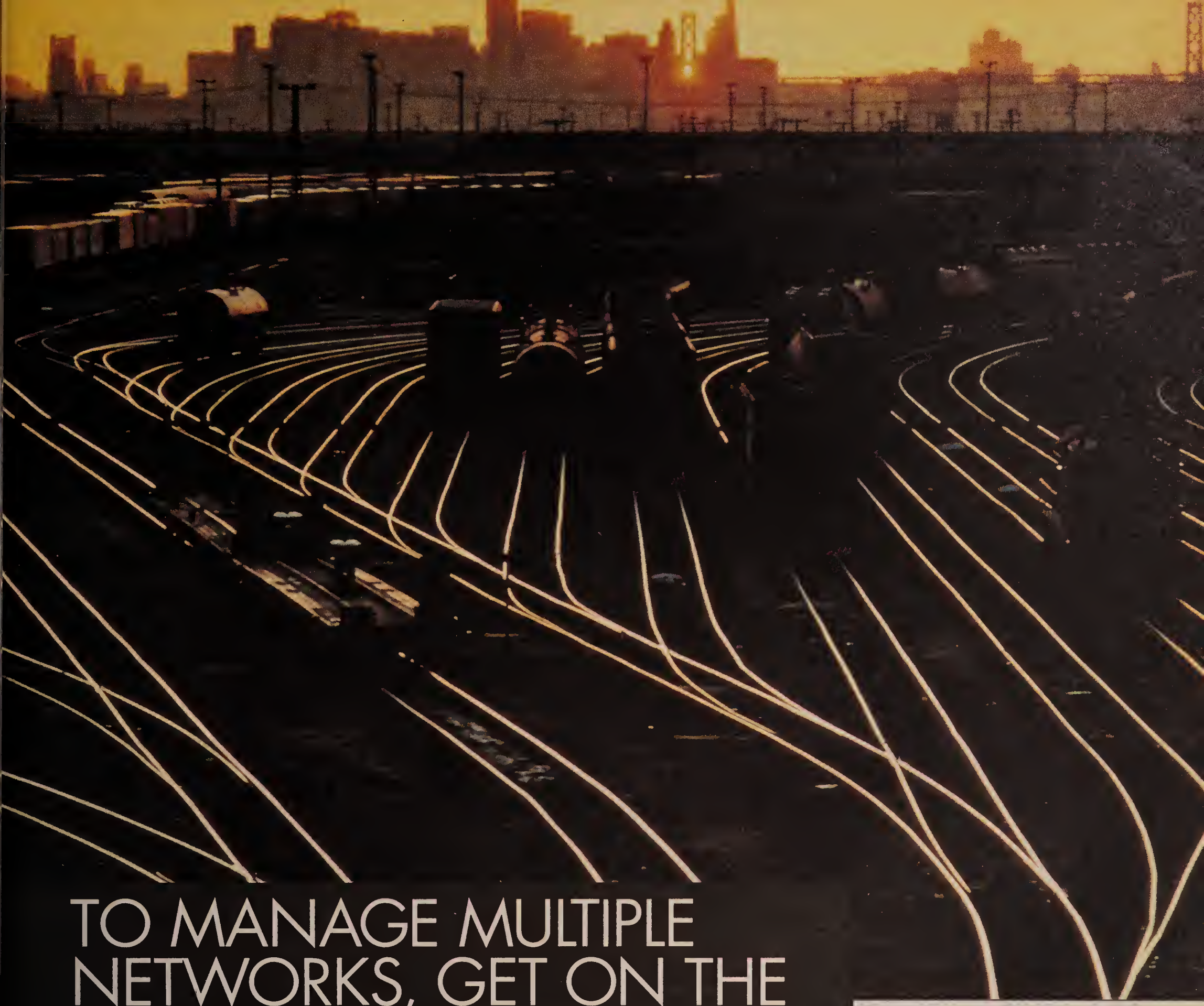

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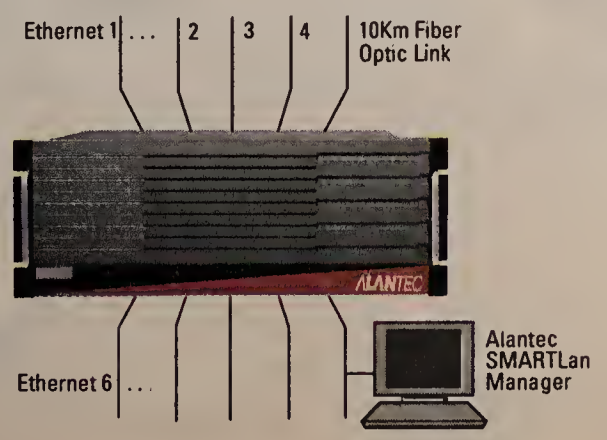

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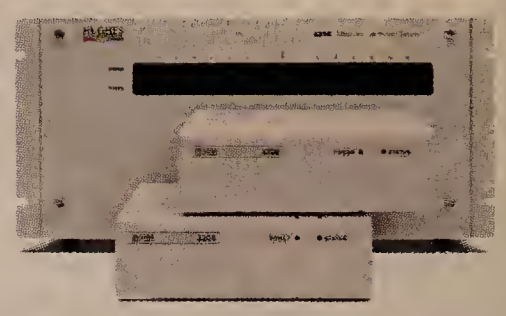

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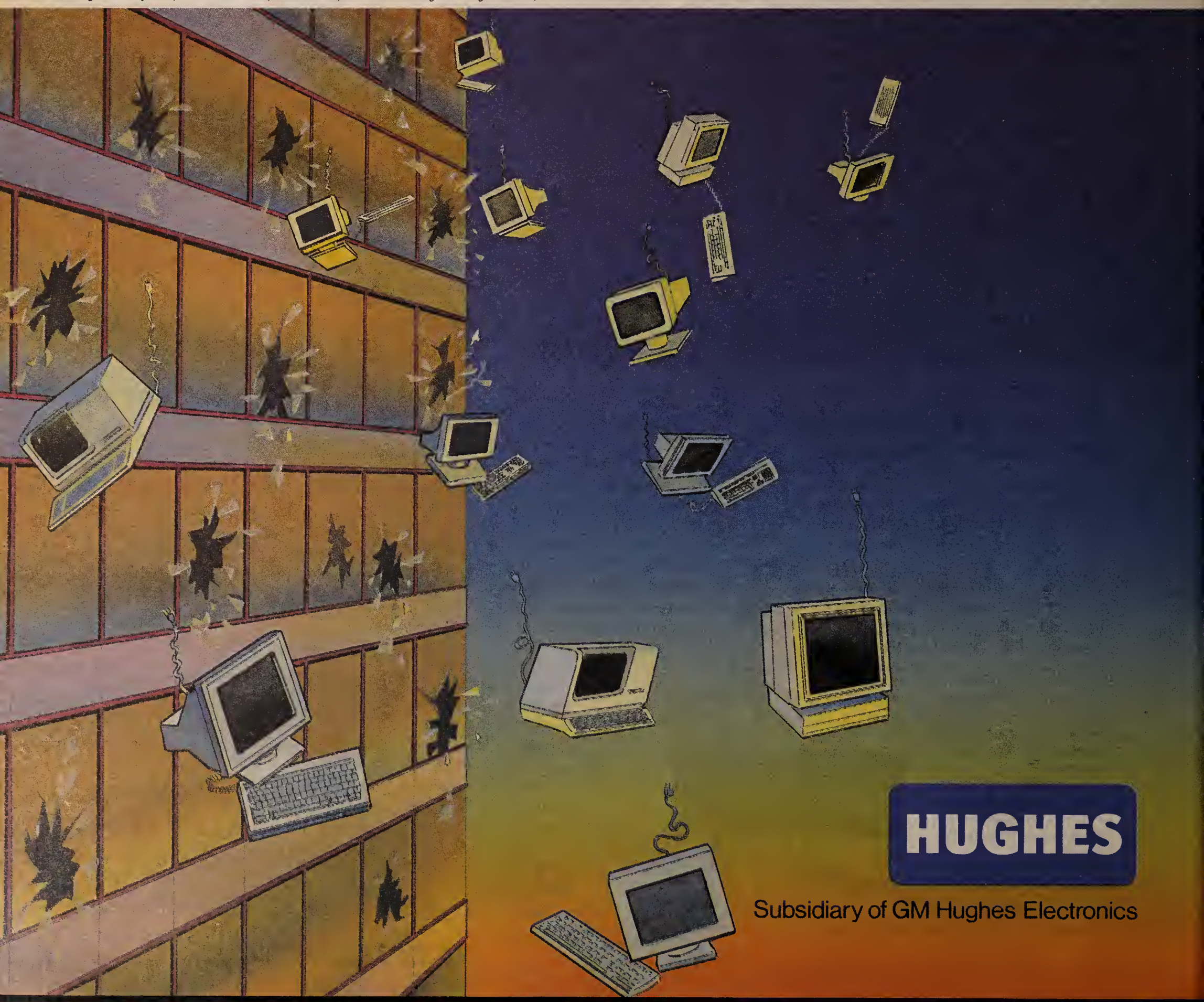

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Barrett is a manager with Network Strategies, a practice of Ernst & Young in Fairfax, Va.

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Setting up the network operating system requires planning for

(continued on page 79)

To rise above the problems that can plague LANs, managers must plan carefully.

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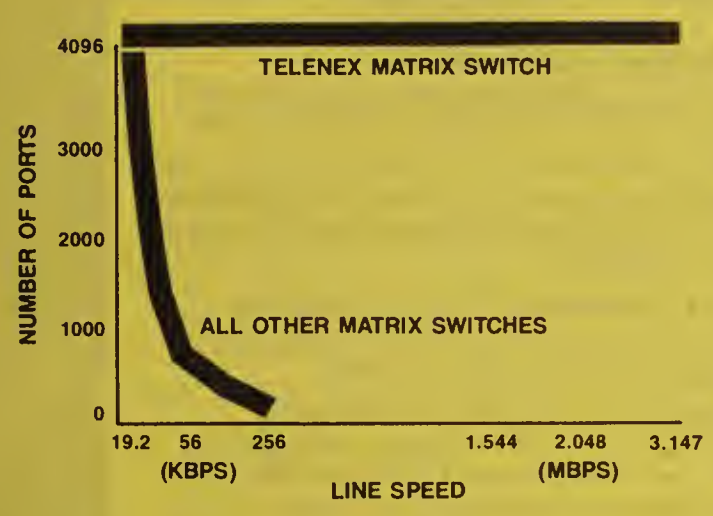

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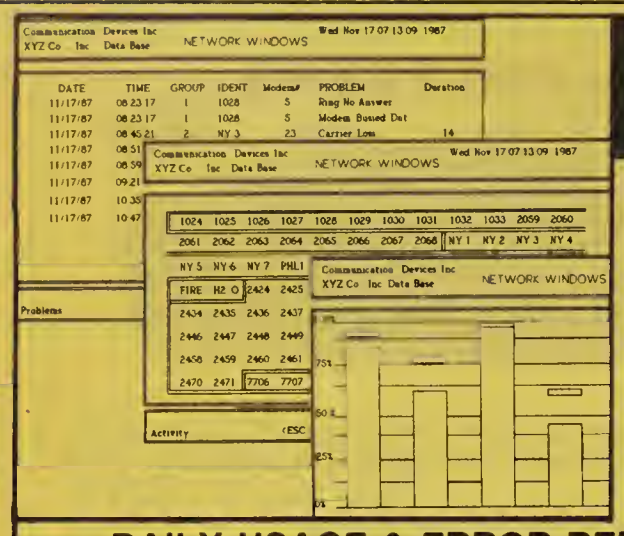

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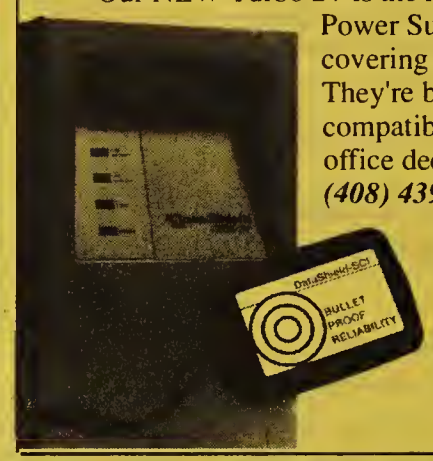

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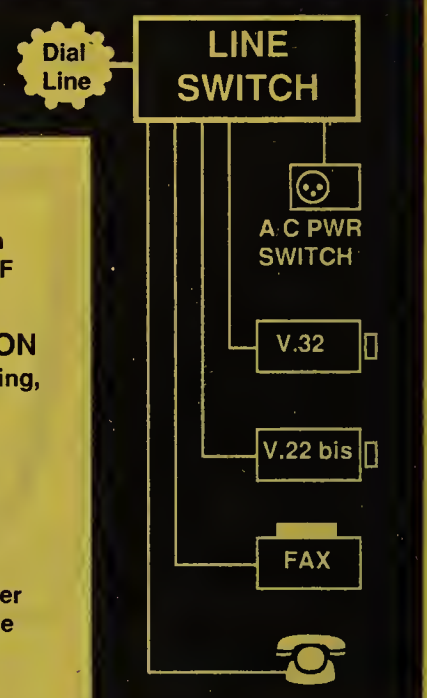

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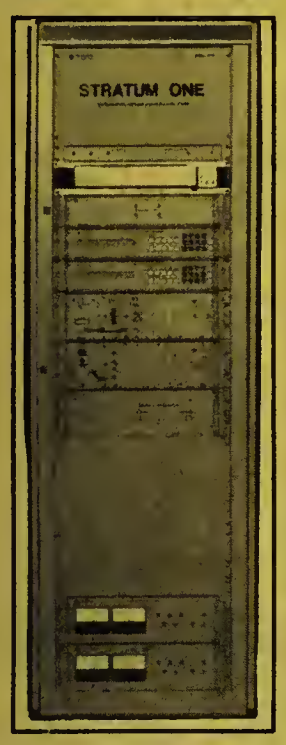

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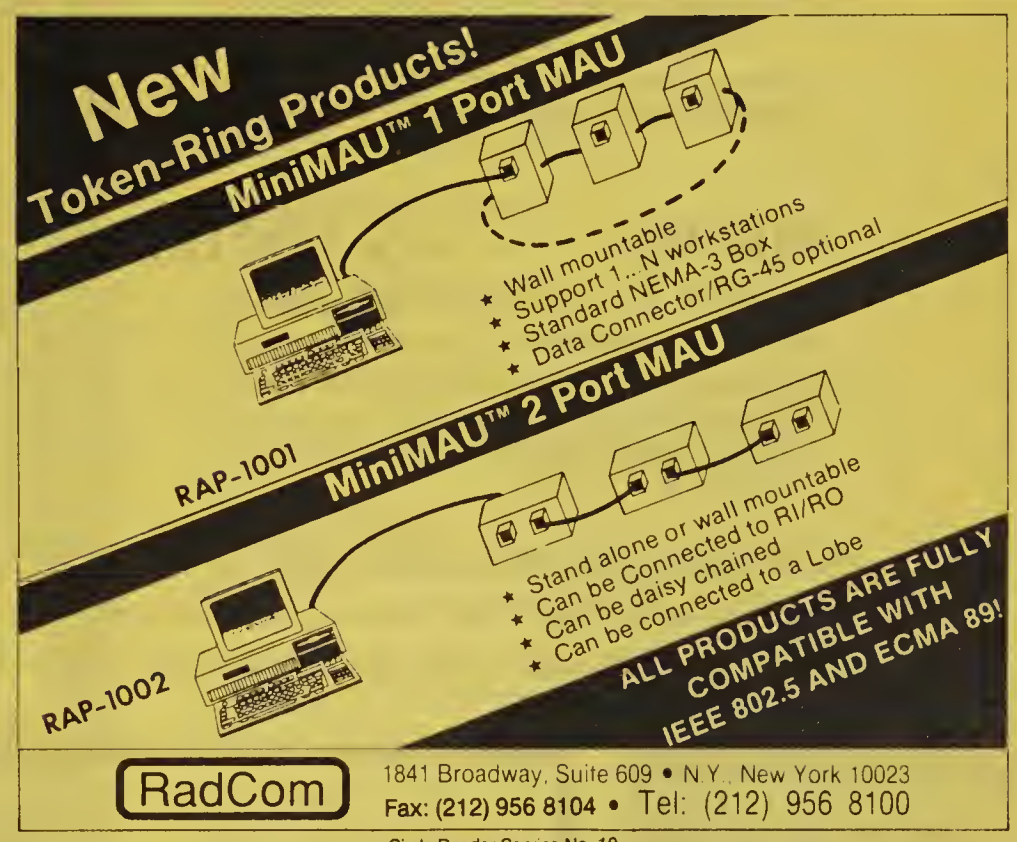

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ComNet

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Scaling the heights

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growth that is often exponential. The naming scheme for users, servers and printers should not be a limitation when bridging networks.

For example, a user name should not be SusieS because of the likely chance that identical names will appear on two networks. A system that uniquely identifies each user, such as the first initial and the last name, is far more effective. Server and printer names should reflect their locations, not the department name, because the department may move while the printer may not.

> Developing security policies prior to net installation can prevent time-consuming efforts later.
>
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Because of concern for user independence, security is an often-overlooked area of LAN management. Chances of a malicious attack on the network are small, but viruses or accidental system file deletion are more common occurrences.

Developing security policies prior to network installation can prevent time-consuming efforts later. At a minimum, write-protecting all system and application files and using passwords will safeguard the operating system. Passwords should change periodically — the larger and more vital the LAN, the more frequent the changes.

For most LAN systems, the gateway functions to the IBM mainframes, minicomputers and dial in/out resources use separate hardware and software that perform the necessary protocol translation and terminal emulation. As a result, they are tricky to install and manage, and require vendor support during installation and operation.

When the LAN is connected to a minicomputer or mainframe, the cooperation of the system's programmers and operators is essential. Learning the protocols and operations of the connected system beforehand will help in understanding and troubleshooting the quirky problems that always arise.

Management structure

Many LAN problems are direct results of insufficient time and support for management functions. A LAN system requires care comparable to that necessary for any mainframe or minicomputer system; however, too often the network manager's other duties prevent the network from getting the attention it needs. The primary responsibility and priority of the network manager — either full time or part time, depending on the size of the LAN — must be the LAN and its operation.

A solution that will maximize efforts is to divide network management functions between departmental administrators and a network manager. The departmental administrators handle user administration, printers and first-level user support. The network manager is responsible for the servers, the network operating systems, upgrades, maintenance and troubleshooting.

In terms of numbers, a good ratio is one full-time network manager for every 50 users on the network. If the LAN has fewer than 50 users, an administrator acts as the manager's backup.

Maintenance contracts

Although maintenance contracts are a network's insurance, few networks have adequate protection. The problem is striking a balance between the cost of LAN downtime and the cost of the maintenance contract. A major network failure is usually sufficient to convince upper management of the need for adequate maintenance contracts.

A commonly used estimate of the cost in lost productivity when the LAN is down is $100 per person per hour. Even at half that amount, it does not take long to pay for a spare server or the Cadillac of maintenance contracts.

Maintenance contracts fall into three categories: hardware, software and workstation. The choices for hardware maintenance — the network servers and the printers — are a third-party vendor or value-added reseller, or, in some cases, the network operating system vendor.

Hardware maintenance contracts should specify vendor response time, on-hand spare parts and loaner equipment. When choosing a vendor, consider its network operating system knowledge — hardware failures may result from software failures.

Good software support is a necessity, especially for the larger network where sheer size and complexity cause unusual problems. Software support may be purchased from a value-added reseller or the network operating system vendor.

A network vendor is more likely to have a team of knowledgeable people, whereas the value-added reseller will usually have one or two persons who are in great demand — especially, it seems, when your network is down.

The disadvantages of the network vendor are its lack of knowledge of your network, lack of concern for your particular problems and needs, lack of support for third-party products and usually higher cost. However, when a serious problem arises, the chances of resolving it are greater.

Workstation maintenance is important because the precise definition of the boundaries between network and workstation prevent finger pointing. Two common workstation problems are that the network card conflicts with other cards already resident in the workstation, and that the network drivers tend to use parts of random-access memory not often addressed and, consequently, kick up faulty memory chips.

Documentation

Two documents should emerge in the LAN's planning phases and benefit from constant updates throughout the life of the network: the Standard Operating Procedures (SOP) manual for the network administrators and managers, and the user manual for the end user. To ensure their use, these manuals should be simple and graphics-oriented.

The SOP should simplify and customize the information included in the vendor manuals so that in the event of illness or absence, the backup manager has a complete picture of the network. It should include a step-by-step description of all routine functions performed by the administrator and the manager, such as server backup procedures, as well as the most recent versions of the server hardware and software configurations, user lists and workstation configurations.

The user manual should include a complete description of each function in the menuing system, a "most commonly asked questions" section, a "what to try when it doesn't work" section and a number to call for help.

Disaster planning

In configuring the network, the preparation of modular contingency plans will keep as many users as possible functional in the event of a disaster. In the case of server or printer failures, redundant equipment or spare parts can shorten downtime. Rather than depending on a single, large server, use multiple, smaller servers so that users and printers can be shifted from one server to another.

In the event of a server failure, the tape backup system is critical for restoring files and directories to a new location. It should be tested constantly to verify the completeness of the backups. If the server location is susceptible to power outages, an uninterruptible power supply will allow graceful shutdowns.

User interface and support

The primary goal of the end-user interface is network transparency. Such transparency will benefit both the user and the network administrator/manager by eliminating many future training and maintenance problems. A customized menu system programmed to provide access to common resources and applications will eliminate the need for the user to learn the network commands.

(continued on page 80)

Tips on cable installation and management

The key to cable system installation and management is knowing the technical specifications for a particular type of cable and keeping the cable within these specifications.

Most cable problems are a direct result of specification violations. If the cable is installed correctly and it adheres to the technical specifications, it should not cause problems. The following are tips for avoiding problems in cable installation and management.

Selecting a standard access protocol such as Ethernet or token ring, and a cable type such as coaxial or twisted pair are the first steps in cable installation. The network operating system, the availability of existing cable and the standards of other local-area networks in the organization will affect these decisions.

Before making a selection, research the available cable types and their respective technical specifications. The technical specifications include the distance limitations, noise levels and so forth that are permissible on the cable. Most LANs can now operate on less costly shielded or unshielded twisted pair; however, the distances between the workstation and the media access unit are shortened.

The next step is designing the cable layout. Design considerations should include: ease and cost of additions and deletions, cable accessibility, capacity for modular growth and ability to stay within the specifications if the net doubles or triples in size.

Although initially more expensive, using multiport devices will lower the cost per node as the network grows and will simplify maintenance because several vendors now offer management software.

Trying several different designs with various cable types will help determine the least expensive configuration for a particular environment.

Cable installation requires detailed knowledge of and experience with the selected cable type. If the expertise is available, it will be less expensive to do the work internally. If the expertise is unavailable, solicit bids from at least three outside vendors who have prior experience in installing the selected cable type.

> Cable installation requires detailed knowledge of the selected cable type.
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Check references to see if the vendor completed previous jobs within the specified time and minimized disruption to the offices by proper cleanup. The installation contract should include stipulations for blueprints showing the exact cable layout and verification that the cable meets the technical specifications.

The cable can be maintained by the network manager, the internal telephone department or an outside vendor, possibly the installation vendor. The decision depends on the size of the company, the available expertise and time, and the financial resources.

The least expensive options are the network manager and the internal telephone department; however, these internal resources may have neither the time nor the expertise. An outside vendor will have the expertise but will be more expensive and probably less timely in responding to problems.

Cable management tools are available from a number of different sources. The new twisted pair-based systems are developing excellent cable management software for their products. In their absence, cable can be managed by network operating system commands (some vendors have more than others), third-party software and hardware equipment such as protocol analyzers and time domain reflectometers.

— Katherine Epes Barrett

(continued from page 79)

The menuing system should include an adjustable but automatic log-off process. Depending on the user and workstation, automatic log-offs can occur every time the user exits from a particular application or the menuing system after a certain period of inactivity or at a certain time of day.

A major consideration for any LAN is end-user support. The network manager rarely has the understanding of the problems facing the end user and, rather than explaining the process, will fix it rapidly, leaving the end user more dependent than ever.

The best solution is a central help desk manned by experienced personnel who can answer most questions and refer the remainder to the appropriate administrator or manager. Not only does this approach provide a single point of contact for the user, but it is also an excellent way of tracking network problems.

Training

The time and money spent on training is more than recouped with the increase in productivity and the decrease in wasted time trying to figure something out. Training should be at three levels: beginner, advanced and refresher.

Most network vendors offer both administrator/manager training and end-user training. The administrator/manager training, which is usually excellent, is a necessity.

The end-user training offered by vendors, however, is usually too general; a training course developed in-house will better address the users' particular needs.

Remember two general guidelines for training: First, hold classes at least monthly so that new users can attend and old users can catch up. Second, customize classes to address the specific needs of a department and take them to the users. Managers are more likely to approve and set aside time for training if it is coordinated through them.

Maintenance procedures

Operations and maintenance procedures fall into three categories: daily, weekly or routine, and occasional. Daily operations are concerned primarily with user administration, such as adding and deleting users; assigning elementary levels of security such as passwords; and allotting disk space.

> A good backup system is critical to quick recoveries from network failures.
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The most crucial task is properly allotting disk space. Different mAN operating systems handle user disk space in different ways, but general considerations include the number of allowable logical drives and maximum disk space.

When adding users, spread departments among different servers so that at least part of a department is operative if a server fails. This approach will also leave room to shift users from one server to another in the event of failure.

Weekly maintenance

Weekly or routine maintenance includes disk maintenance, backups, server configurations and electronic mail. Server configurations and E-mail are checkup routines to verify proper operation.

The network manager should print weekly the most recent server configurations, including system parameters, printer port assignment, user name list and disk space allocation for the SOP manual. E-mail maintenance will depend on the E-mail package, but cleaning up old E-mail and checking mailbox allocation are two common tasks.

Disk maintenance includes determining file activity and archiving unused files. Users tend to store all files on the network and never clean them up. By archiving those files, valuable space can be retrieved for network use.

Another disk management task is periodically reformatting the server disks. As files are added and deleted, areas of unused space develop, which can only be reclaimed by reformatting the disks. It is also an excellent way to verify backups.

A good backup system is critical to quick recoveries from network failures. To simplify the process, a programmable tape backup unit can automatically perform incremental and full backups of all the servers.

The program should back up completely each server once a week, with incremental backups at least twice weekly.

Using three sets of tapes — grandfather, father and son — and a monthly archive will ensure access to uninfected files in the event of a virus, or accidently or maliciously deleted files. Off-site storage for one year will further protect archived tapes.

> The network manager sets the system parameters for the network operating system during software installation.
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Occasional maintenance

Certain operations and maintenance tasks are done on an ad hoc basis. These tasks include adjusting system parameters, printer maintenance, and additions and upgrades.

The network manager sets the system parameters for the network operating system during software installation. These parameters tailor such things as memory usage and file buffers to provide the best server performance for a given number of users. As the network grows, the parameters need periodic adjustment to maintain optimal performance.

Network printers, especially laser printers, require more care because of heavy use. Most of the small laser printers, such as the Hewlett-Packard Co. Laserjet Series II, are made to print a maximum of about 3,000 pages per month. In some areas, these printers may print far more and, consequently, have maintenance problems.

Cleaning and changing the toner cartridges regularly will help to extend the life of the printer. To prevent jamming, the paper should meet the specifications in the manual and be stored in a cool, dry area where the paper will not absorb humidity. The paper supplier's warehouse should also meet these criteria.

Adding to or upgrading the network requires meticulous planning to minimize disruption to end users. A detailed schedule listing each step and its duration and assigning task responsibilities will eliminate many problems. Be sure to include ample time for the unexpected problems that always crop up.

Upgrades and additions are simpler if network software and applications reside only on servers. Only the network drivers and logon command should reside on the workstation. Although this will increase traffic on the network, the advantages of control, standardization, single software versions and single location justify it.

System failure guidelines

Each network failure is unique, but the following set of guidelines applies to any failure:

- Put your contingency plans into effect. Shift users, data and printers around to maximize the remaining operative resources.
- Set your priorities. Don't panic and listen to whomever is yelling loudest. Decide what needs to be done and in what order.
- Keep your users informed on the progress. Uninformed users will think the situation is desperate or will keep trying the network to see if it is up again.
- Keep your priorities straight. As you are troubleshooting, you may discover other problems. Don't get distracted — if these problems don't directly affect the present situation, make a note of them and deal with them later.
- Trust your instincts. Protocol analyzers, the network operating system management tools and third-party management software can help you track down problems. You, however, are the one who has to process their information.
- Use a team to track down the problem if possible. The old adage "Two heads are better than one" is true; have at least one colleague testing theories.
- Collocate network equipment where possible. If the servers and gateways are in the same room, troubleshooting problems will be easier.
- Use the crash to your advantage. There is no easier time to get additional equipment, personnel or maintenance approved. This is the time to say, "I told you so" and get the necessary signatures for maintenance contracts and spare equipment.

The keys to successful network management are planning, maintenance and documentation: planning for expansion, disaster and change, maintaining peak condition and documenting every change and adjustment. The control and effectiveness of the LAN is directly proportional to the effort the LAN manager has put into it.

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NETWORK WORLD

Letters

continued from page 47

months and then sidetracked for an indefinite period should be applauded. General Motors demonstrated a bias for action, which is all too often lacking in American industry.

We share with you in the hope that the NIU Forum will resolve "proposals regarding future administration." We also have some degree of confidence that the forum's recently declared moratorium on holding external events will have a happy conclusion.

To suggest that General Motor's actions "could be devastating" to the NIU Forum's progress implies that people shouldn't come forward with new ideas. And it is ideas such as these that have gotten the forum where it is today.

Jim Adams, the president of Southwestern Bell Telephone Co., is fond of reminding the company's employees that he believes in "constructive impatience." If the activities of the GM representative at the NIU Forum represent the attitudes of typical GM employees, then Adams and GM Chairman Roger Smith would probably enjoy each other's company.

Ken Goodgold
Area Manager
Customer Applications
Analysis
Southwestern Bell
Telephone Co.
St. Louis

EDI trade pact follow-up

Your recent article titled "ABA readies model EDI trade pact" (*NW*, Sept. 18) does not accurately state when the work of the model agreement will be completed.

The model agreement and supporting documentation are near completion; they are expected to be ready sometime this fall, and at that time, will be available through the American Bar Association.

Work on that model agreement began in 1987, under the auspices of the Ad Hoc Subcommittee on Scope of the Uniform Commercial Code, which is chaired by Professor Amelia Boss. When the Ad Hoc Subcommittee was reorganized recently, the project was moved to the authority of the newly formed Subcommittee on Electronic Commercial Practices.

The Subcommittee on Electronic Commercial Practices will focus on how changing technology impacts the way business is conducted. It will also identify legal problems arising from the integration of electronic or other technological practices into trading, as well as legal issues that might hinder the adoption of new technologies.

The subcommittee is charged with monitoring developments, informing itself and others as issues are identified, and cooperating with industry and law reform groups in developing appropriate solutions.

We would welcome the participation of any of your readers who are members of the American Bar Association.

The members of the Electronic Messaging Services Task Force, which comprises Michael Baum of Cambridge, Mass.; Boss of Philadelphia; Thomas McCarthy of Wilmington, Del.; Philip Otero of Rockville, Md.; and Jeffrey Ritter of Columbus, Ohio, have worked hard to prepare a model agreement that electronic data interchange trading partners can use.

The model agreement and subsequent supporting documentation are designed to be an integrated tool and valuable resource for companies and counsel as they begin establishing new trading partner relations or review agreements now in place.

The task force was organized as a group within the American Bar Association, although it does not speak for the association. The work of the task force — the model agreement and documentation — will be available through the American Bar Association upon completion of the project.

Anyone who would like to obtain further information about the model agreement or the Subcommittee on Electronic Commercial Practices, may contact the committee's spokesman, Thomas McCarthy, at E.I. duPont de Nemours & Co., 1007 Market St., Wilmington, Del. 19898, or call (302) 774-3014.

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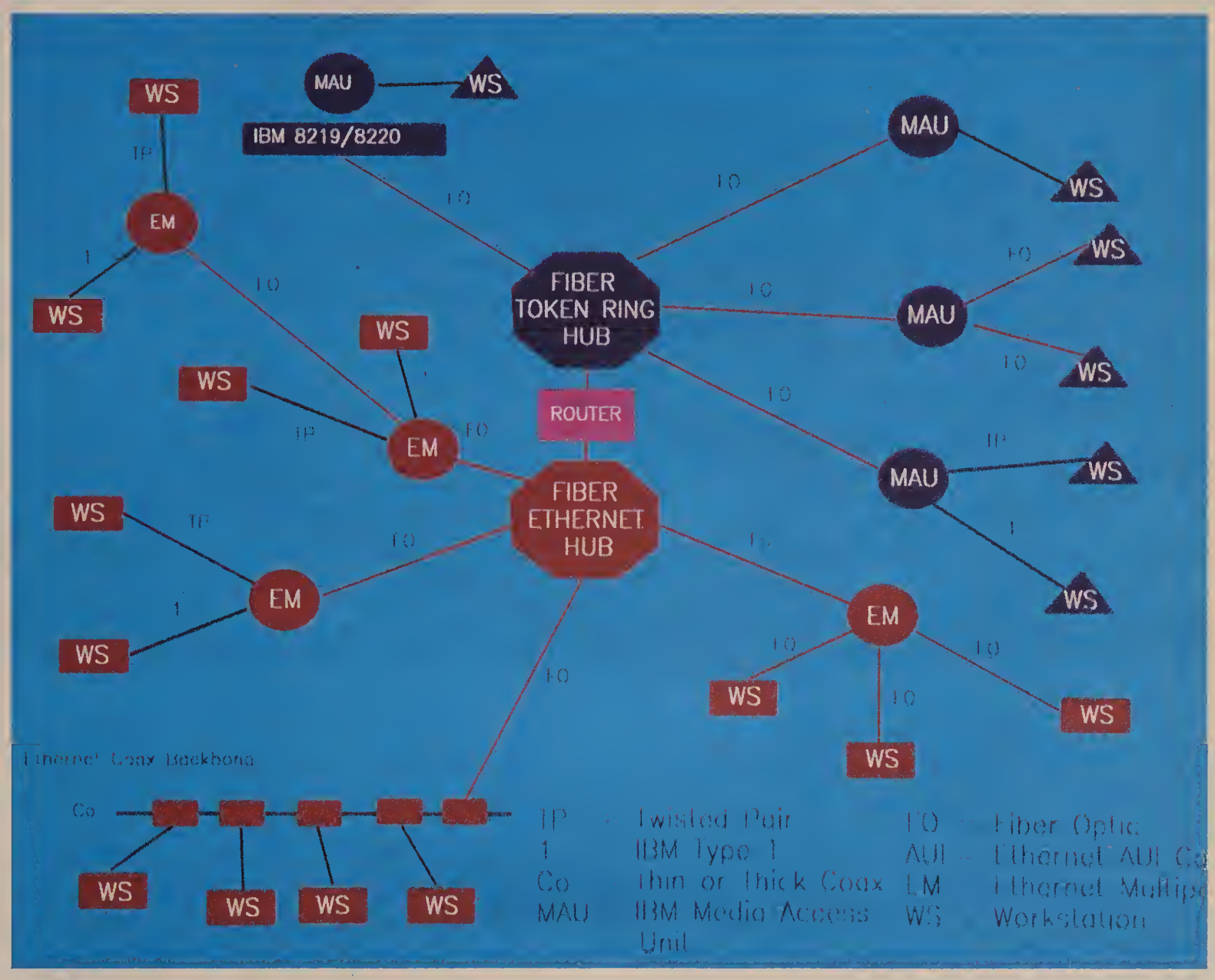

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EDI untapped by many users

continued from page 2

Ruth Anderson, a vice-president at EDI Research.

However, a significant number of companies are now using EDI, compared to four or five years ago when virtually none did, she said. "Overall, that's a pretty good growth rate."

The study showed that companies will continue to add EDI trading partners and deliver a larger percentage of their business documents via EDI. These developments will account for most of the future growth in EDI, the study said.

Gradual expansion

Most firms currently using EDI plan to add four additional trading partners in 1989 and 10 in 1990. This modest growth shows that most companies are still pilot-testing EDI and are only gradually expanding its use, Andersen said.

Roger Cadaret, an EDI consultant at Arthur Young & Co. in Detroit, agreed. He said most Fortune 1,000 companies have implemented EDI but not in a corporatewide manner. Most EDI projects are carried out by middle managers at the departmental level in relative obscurity.

"Most companies have yet to integrate EDI wholesale into their general business operations," Cadaret said.

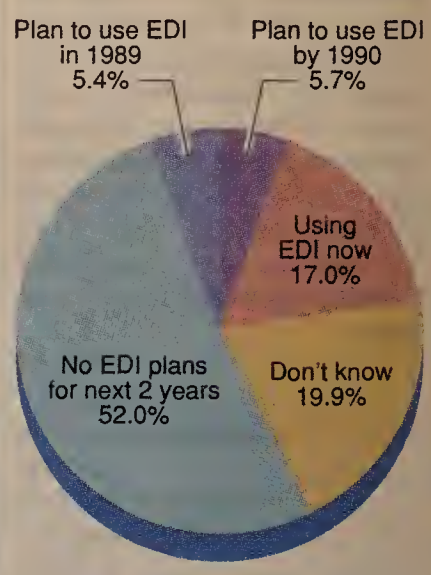
The survey shows that a few larger firms are adding EDI trading partners at a much faster rate. On average, these firms plan to add 21 new EDI trading partners in 1989 and 33 in 1990.

"To a significant extent, EDI is driven by a few big companies that are rapidly expanding the number of trading partners," Anderson said. "The rest of the EDI users still are conducting pilot tests with fewer than five trading partners."

Companies also plan to deliver an average of about 36% more business documents via EDI in the next three years vs. alternative forms of business-to-business communications, such as postal mail, electronic mail, facsimile and telex.

Currently, companies deliver almost 90% of their business documents to trading partners by telex or fax, according to the survey. These documents include purchase orders, letters, memos, bills of lading and requests for quote. The study shows that companies plan to convert about 20% of their interbusiness fax and telex traffic to EDI in the next two years.

EDI use at Fortune 1,000 firms



SOURCE: EDI RESEARCH, INC., OAK PARK, ILL.
GRAPHIC BY SUSAN J. CHAMPENY

Other survey findings include:

- Fifty percent of EDI users said they implemented EDI to speed communications with trading partners; 15% did so to reap cost savings; 15% did so at a customer's request; and 12.5% did it to improve the accuracy of their business data.
- The most common barriers to establishing EDI with trading partners or expanding its use are: lack of compatible software, hardware or EDI formats; unwillingness of the trading partner; and an unsatisfactory cost-benefit analysis.
- Thirty-five percent of companies surveyed said they rely on a value-added network to transport EDI messages.
- Companies often run EDI software on more than one machine. Two-thirds of EDI users run EDI software on personal computers, and an equal number run EDI software on mainframes.
- Almost half of the EDI users purchased third-party translation software; about 40% of those users modified the software to suit their operational needs.
- Slightly more than one-tenth (11.7%) of all EDI users currently make electronic funds transfer payments using EDI and 27% receive EDI-based payments from customers.

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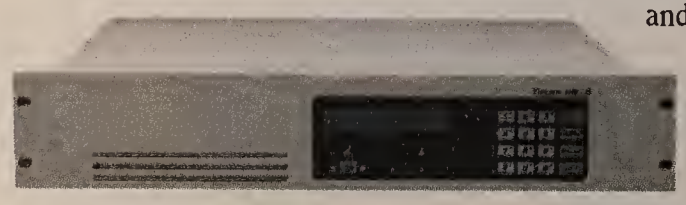

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Nov. 13-15, Atlanta — Networking Personal Computers. Contact: New York University, School of Continuing Education, 575 Madison Ave., New York, N.Y. 10022; (212) 580-5200.

Nov. 13-15, Atlanta — 16th Annual Computer Security Conference. Contact: Computer Security Institute, 360 Church St., Northborough, Mass. 01532; (508) 393-2600.

Nov. 13-16, Toronto — James Martin World Seminar. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402; (213) 394-8305.

Nov. 14-17, Montreal — Network Cabling and Wiring Techniques. Contact: Learning Tree International, 6053 W. Century Blvd., P.O. Box 45974, Los Angeles, Calif. 90045; (213) 417-8888.

Nov. 14-17, Los Angeles — PC Networking: Hands-On Workshop. Contact: Learning Tree International, 6053 W. Century Blvd., P.O. Box 45974, Los Angeles, Calif. 90045; (213) 417-8888.

Nov. 15, New York — Evolving Toward the Intelligent Network: Digital Switching in the 1990s. Contact: Robert Puttre, Nynex Science & Technology, 500 Westchester Ave., White Plains, N.Y. 10604; (914) 683-3151.

Nov. 15-17, Cambridge, Mass. — New Developments in Digital Scanners, Automatic Digitizers, and Document Distribution. Contact: CAP International, 1 Longwater Circle, Norwell, Mass. 02061; (617) 982-9500.

Nov. 15-17, Houston — Sixth Annual Buildings Show. Contact: Marvin Park Associates, 600 Talcott Road, Park Ridge, Ill. 60068; (312) 823-3599.

Nov. 15-17, San Diego — Micro/Mini & Micro/Mainframe Connectivity: Practical Linking Tools & Techniques. Contact: Learning Tree International, 6053 W. Century Blvd., P.O. Box 45974, Los Angeles, Calif. 90045; (213) 417-8888.

Nov. 16, Woburn, Mass. — Current Trends in EDI. Contact: Unisys Corp., 400 Unicorn Park Drive, Woburn, Mass. 01801; (617) 938-7500.

Nov. 16, Detroit — Open Software Foundation/Motif Software Developers Seminar. Contact: Open Software Foundation, 11 Cambridge Center, Cambridge, Mass. 02142; (617) 621-8700.

Nov. 16-17, Arlington, Va. — The Marketing Applications of 800 Numbers, 900 Numbers and Other Phone Services. Contact: Marketing Institute, 331 Madison Ave., 6th Floor, New York, N.Y. 10017; (212) 883-1770.

Nov. 16-17, New York — Disaster Recovery and Planning. Contact: New York University, School of Continuing Education, 575 Madison Ave., New York, N.Y. 10022; (212) 580-5200.

Nov. 21-22, New York — Local Area Networks. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015; (201) 478-5400.

Nov. 27-28, Boston — Networking PCs. Contact: Boston University Metropolitan College, 755 Commonwealth Ave., Boston, Mass. 02215; (617) 570-8066.

Nov. 27-30, Dallas — Globecom '89. Contact: IEEE, c/o NEC America, Inc., P.O. Box 167942, Irving, Texas 70516; (214) 380-4680.

Nov. 28-30, Palm Springs, Calif. — InfoSec '89. Contact: Advanced Computing Environments, Suite 100, 480 San Antonio Road, Mountain View, Calif. 94040; (415) 949-3399.

Nov. 28-30, New York — Telecommunications: Changing the Way We Live and Work in the '90s. Contact: Communications Managers Association, 40 Morristown Road, Bernardsville, N.J. 07924; (201) 766-3824.

Nov. 28 - Dec. 1, San Diego — Introduction to Datacomm & Networks. Contact: Learning Tree International, 6053 W. Century Blvd., P.O. Box 45974, Los Angeles, Calif. 90045; (213) 417-8888.

Nov. 28 - Dec. 1, Washington, D.C. — OSI Product Integration Conference. Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903; (301) 445-4400.

Nov. 29 - Dec. 1, Long Beach, Calif. — Macintosh Business Conference and Exposition. Contact: Cambridge Marketing, Inc., 1 Forbes Road, Lexington, Mass. 02173; (617) 860-7100.

Nov. 29 - Dec. 1, Dallas — Introduction to Network Management. Contact: International Communications Association, Suite 710, 12750 Merit Drive, Dallas, Texas 75251; (800) 422-4636.

Nov. 29 - Dec. 1, Worcester, Mass. — Effective Analysis and Design of Information Systems. Contact: Worcester Polytechnic Institute, Office of Continuing Education, Worcester, Mass. 01609; (508) 831-5517.

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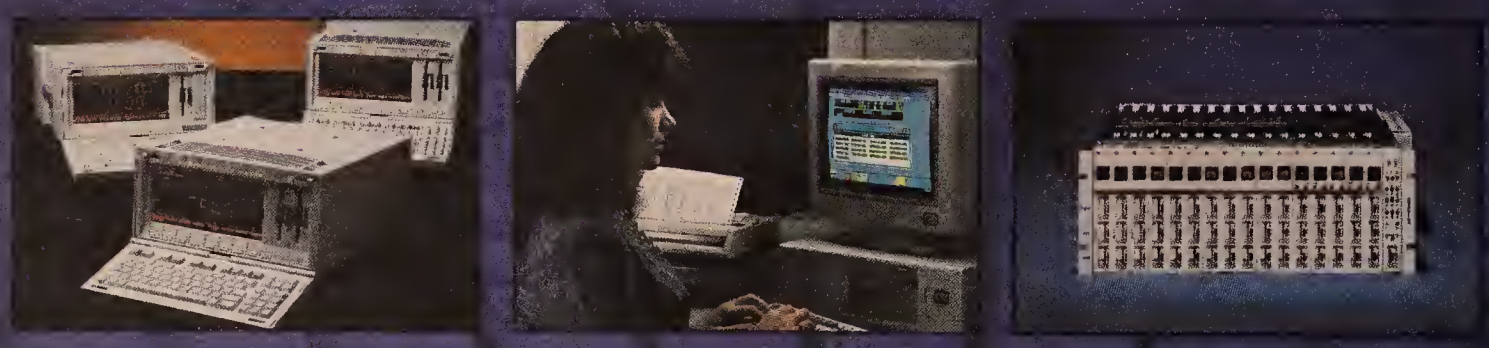

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AT&T unveils two ringdown calling services

By Gail Runnoe
Washington Correspondent

BASKING RIDGE, N.J. — AT&T last week introduced two automatic call connection services — one offered under the carrier's virtual private network service and the other supported over private lines.

Express Connect, a new feature of AT&T's Software-Defined Network (SDN) service, enables users to call a predetermined location just by picking up the phone. Provided over AT&T's long-distance network, Express Connect creates a virtual point-to-point private-line connection, the carrier said.

Traditionally, automatic connection services — also known as automatic ringdown lines — have only been available on private networks and have been economical only for businesses with a high calling volume, said Roger Ludwig, AT&T's SDN Express Connect product manager.

Express Connect "gives a private-line-like service to customers that before couldn't afford" a private line, Ludwig said. Private-line users may be able to reduce costs by replacing leased facilities with Express Connect service.

Customers must have dedicated access to AT&T serving offices on both ends of the connection and must guarantee a minimum monthly usage of $50. Pricing is based on usage. In addition to usage charges, users also pay an installation fee of approximately $1,800, Ludwig said. This rate varies according to geographic area and the length of the connection between the user's site and the central office. There is a $350 per month access charge.

In addition to Express Connect, AT&T also introduced the financial communications arrangement, an automatic call connection service among designated points in the New York and Chicago financial districts. It is provided over 64K bit/sec digital private lines as an option under AT&T's Accunet Spectrum of Digital Services, digital transmission services ranging from 64K bit/sec to T-1 speeds. The cost for the financial communications arrangement includes a flat fee of $650 per month and an $800 installation fee.

Both Express Connect and the financial communications arrangement are scheduled to be available Dec. 17.

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—**John R. Smart,** President, AT&T, Business Communications Services (Tuesday, November 28)

—**Victoria Brown,** President, Timeplex, Inc. (Wednesday, November 29)

—**William Ferguson,** Chairman and Chief Executive Officer, NYNEX Corporation (Thursday, November 30)

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Food co. chooses Infonet to run DP, net

continued from page 2

Davis said it was more cost-effective to farm out computing and network support services to Infonet than to build and operate a data center. He declined to say how much money the firm will save nor would he reveal the value of the contract.

JP Foodservice selected Infonet from several competitors because of its experience in facilities management, he said. The move comes on the heels of similar deals signed by large users, including Eastman Kodak Co. and Merrill Lynch & Co., Inc.

Early this fall, Merrill Lynch turned over responsibility for managing its global network to MCI Communications Corp. and IBM ("Merrill Lynch to farm out its net management duties," *NW,* Sept. 11). Last month, Eastman Kodak announced that it intends to let Digital Equipment Corp. manage its voice and data networks ("DEC to become Kodak's primary communications net contractor," *NW,* Oct. 30).

"Companies need to focus on the bottom line, and the best way to do that is to focus on the core business, instead of getting bogged down in running a data processing or network department," said Ron Brown, an independent telecommunications consultant in Melrose, Mass.

Third-party vendors handling multiple accounts can achieve operational economies of scales that most users can't, said Dave Schnebele, branch manager of commercial services for Infonet. Schnebele said companies can save 20% to 30% by farming out net and computing support.

Infonet will run JP Foodservice's applications on an Amdahl Corp. 3890-300E mainframe at its computer services center in Beltsville, Md., where it houses its net control center.

By early next year, Infonet will link IBM 3274 cluster controllers in each JP Foodservice distribution center to the mainframe via leased lines running at speeds from 9.6K to 56K bit/sec. Infonet will monitor net performance and provide necessary technical support.

Users working at terminals at JP Foodservice's distribution centers will access the applications, which include inventory management and tracking, general ledger, payroll and order entry.

Currently, JP Foodservice distribution centers are linked via leased lines to PYA/ Monarch's data center in Greenville, S.C.

According to Davis, JP Foodservice's staff will initially meet weekly with Infonet officials to review progress of cutting over the network and data center.

Timeplex widens net consulting options

continued from page 4

ment from multiple vendors at Timeplex sites.

Analysts said the expanded service offerings make sense for Timeplex.

"They're doing it because they want to improve their revenue growth. It's just good business," said Timothy Zerbiec, a principal with Vertical Systems Group, a Dedham, Mass., consultancy. "They're doing it to demonstrate that not only can they sell you the box, but they can sell you the support [too]."

Under the Network Management program, Timeplex senior-level network management staffers go to the user's site to analyze the network, make recommendations and participate in implementing changes that will improve the user's net management capabilities, said Ron Weiger, Timeplex's field service marketing manager. Timeplex will help users establish problem management systems and procedures, measure network and vendor performance, and coordinate equipment installation.

Weiger explained that Timeplex will not actually take over operation of a user's net; Network Management is a consulting service aimed at helping users deal with problems. The service is offered for any vendor's equipment.

"We've got a lot of experience with customers and internally in running network control centers," Weiger said.

By offering the service to users that are not already Timeplex customers, the company expects to open new avenues for sales of its equipment, he said.

Under the second new service, Network Optimization, Timeplex personnel will help users consolidate their networks, standardize equipment, or analyze net design and performance, Weiger said.

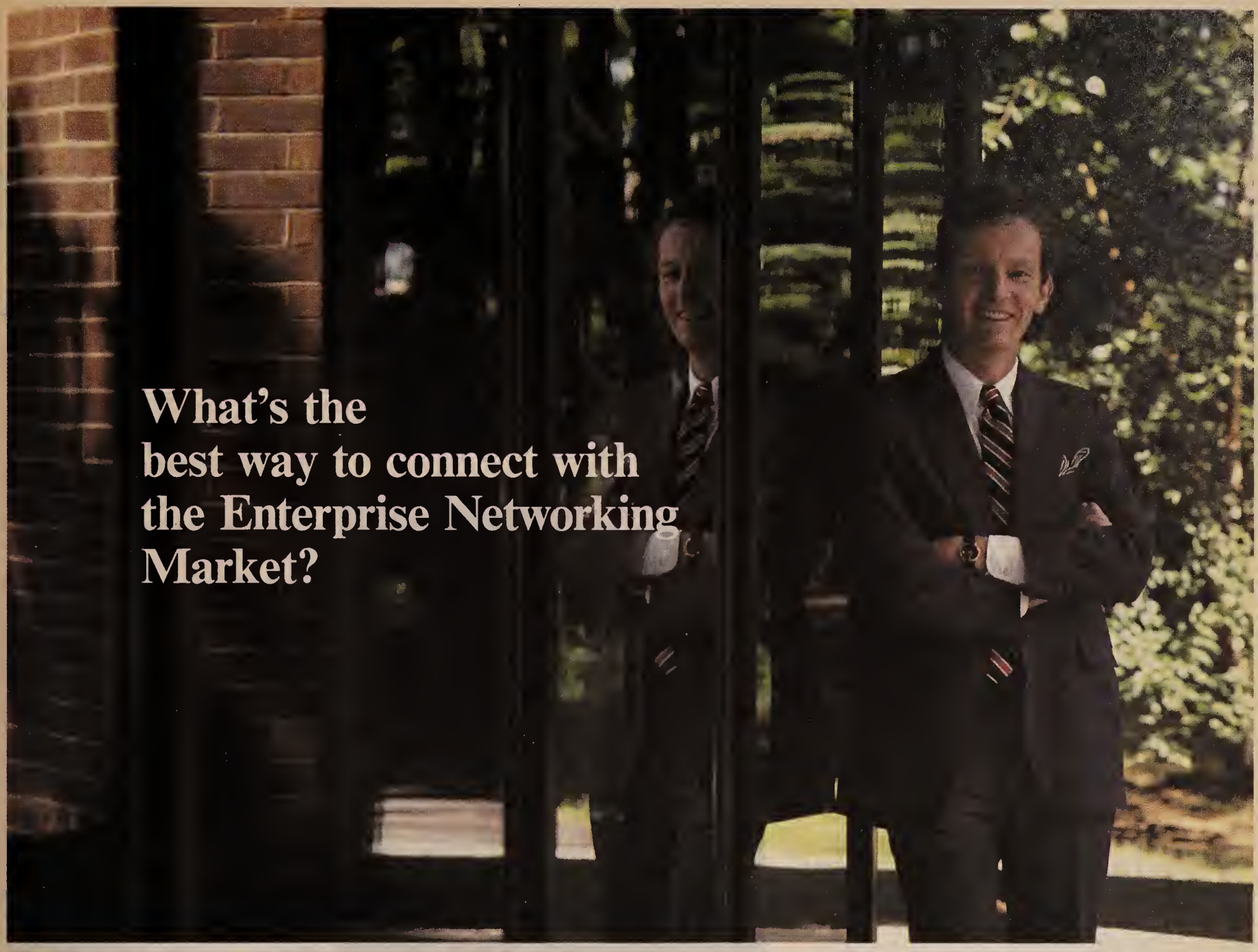
"Many potential customers have been growing their networks in a random fashion over the years," he said. "They're looking for some vendor to come in and analyze where they've grown from and where they're going."

Timeplex will use whatever tools the customer has or recommend additional equipment as necessary, he said. This contrasts with vendors such as Infotron Systems Corp., which helps users reconfigure networks using its own network optimization software.

Under the new Net-Search program, Timeplex will tap its own network of placement agencies and internal sources to help users find qualified network staff. Timeplex will also train new employees to operate Timeplex equipment, arrange training for other vendors' equipment and conduct generic training in areas such as network management and design, Weiger said.

The new services are available now. The costs for Network Management and Network Optimization vary widely, depending on the duration and complexity of the project. Net-Search pricing is based on a one-time fee of about 30% of the employee's salary.

Gary Beach, Publisher, *Network World*



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continued from page 5

ules. A trouble tickets module enables users to generate trouble tickets for desktop devices and track repair work. A work orders module lets the user create repair orders for inoperable equipment. The work orders can be printed out or sent electronically to a staff technician.

The cable and wires module enables users to maintain inventory of all wire and cable used from the building entry to the desktop. A stock inventory module lists all desktop devices in use or in storage. An employee configurations module lists equipment type and service features used by employees, and a cost allocation module provides users with call records for use in billback applications.

The Telecommunications Resource Management System can be bought by module and will be available in March. AT&T did not give pricing for the system.

AT&T also announced an upgrade to an AT&T minicomputer-based system that telephone companies use and users may access to collect station message detail data and trunk usage information from AT&T central office switches. The Basic Communications Package (BCP) Version 3 software runs on an AT&T 3B2 Model 600 minicomputer and collects data from up to 10 5ESS or 1AESS switches.

The new release ups the number of users that can dial into a single BCP from 10 to 75. Users download data into premises-based microcomputer, minicomputer and mainframe-based telemanagement systems. The data can be used to create traffic and user reports.

Northern Telecom's Meridian Digital Centrex CLASS is new central office switch software that uses CCS7 to support five advanced Centrex features across a network of DMS-100 switches and CLASS-compliant analog or digital end offices made by other vendors.

Features supported include calling number identification and selective call forwarding, which enables a user to forward calls from preselected telephone numbers to a remote location, while other calls are forwarded to another station.

The new CLASS software also supports automatic redial; ring-again, which automatically calls back a busy number; and distinctive ringing, which assigns a special ringing cadence for different calls.

AT&T chalks up two more Tariff 12 deals

continued from page 2

bit/sec Digital Dataphone Service and Accunet T1.5.

The carrier also filed with the Federal Communications Commission a three-year Tariff 12 plan for another customer that is worth a minimum of $14.8 million annually for the first and second years and $7.4 million for the final year.

That network includes 1,029 voice ports and 499 data circuits, including 60 T-1 lines. Prices per minute range from 6.1 cents for a 200-mile call to 10.7 cents for a 5,000-mile call.

Citinet

The Citibank Tariff 12 network will interconnect the company's Hunt Valley, Md., headquarters for its credit card operations with about 24 customer service, collections and data center locations throughout the country. It will support credit card authorization traffic, customer information services and voice traffic between the sites.

The network will have nearly 2,700 voice ports and 224 data lines, including 113 T-1 circuits.

The availability of centralized network management was key to Citibank's decision to purchase a Tariff 12 network, according to William Ahearn, a spokesman for the company.

AT&T will establish a network management center in New York to monitor network performance and provide 24-hour reporting capabilities to Citibank. Performance reports will be issued on demand to a Citibank printer, according to AT&T.

The new network monitoring capabilities will give Citibank more control over its traffic and will enable it to optimize customer services such as credit card authorizations, according to Sushil Kapur, director of network services for Citibank.

Ahearn agreed, saying that success in generating new credit card accounts is almost totally dependent on the customer service a financial institution offers.

Currently, the company is adding four million new credit card customers each year. Its network handles about 70,000 voice calls per day and data transactions worth approximately $30 billion annually, he said.

"With such an enormous volume, you not only have to have the best system now, you have to have the best system for five years from now," Ahearn said.

Citibank's network provides service for locations in the U.S., Puerto Rico and the U.S. Virgin Islands, as well as handling calls made from the network to 53 countries worldwide.

Per-minute prices for on-net calls placed during business hours range from 6.2 cents for a 200-mile call to 13.3 cents for a 5,000-mile call. Citibank will qualify for volume discounts on all monthly domestic charges over $30,000 and all international monthly charges.

Discounts for domestic service range from 5% for charges between $30,000 and $200,000, to 12% for charges between $800,000 and $1.4 million. The maximum discount will be 18% for charges over $2.1 million.

Discounts for international service are 1% for charges up to $50,000; 4% for charges between $150,000 and $200,000; 7% for charges between $300,000 and $350,000; and a maximum of 10% on charges between $450,000 and $500,000.

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ISDN holds promise for EDI

continued from page 1

said, "We want to evaluate the potential of ISDN to provide an EDI delivery system to midsize and small businesses. ISDN gives them a low-cost net without the major investments that large corporations have already made."

Moreover, ISDN can simplify EDI use, according to David Norem, assistant director for automation support and technology for the Office of the Assistant Secretary of Defense for Production and Logistics.

"Without ISDN, somebody has to design a net, develop it, manage it and determine addresses," he said. With ISDN, building an EDI net can be as simple as connecting devices to the public net. Norem's office deals with issues relating to contracts between the Department of Defense and suppliers. One of its goals is to reduce the amount of paperwork involved in such transactions.

Transmission of graphics along with an EDI message would be one key benefit to users with EDI applications that take advantage of ISDN, said Roy Saltman, computer scientist and EDI project leader at the National Institute of Standards and Technology in Gaithersburg, Md.

"Two individuals representing sales and engineering, for example, could see graphics or part descriptions displayed while they talked on the phone," Saltman explained. While looking at the document simultaneously, they could send an EDI document with the graphics included.

The bandwidth provided by the Basic Rate Interface would benefit users that currently send messages over leased or dial-up lines at speeds of 9.6K bit/sec. "If you're dealing with long EDI messages that include graphics, the higher transmission speed of ISDN would be advantageous," Saltman said.

The NIU Forum's EDI working group will try to convince major EDI software vendors to bring their products into conformance with an application interface to ISDN that is currently under development within the NIU Forum.

Within six months, that interface should be stable enough that software developers can begin to develop products that comply with it, said Reginald Best, chairman of the application software interface group within the NIU Forum's ISDN Implementors' Workshop. Best is director of development at Teleos Communications, Inc. in Eatontown, N.J.

It is also hoped that vendors will demonstrate applications they develop, either at a future meeting of the forum or at its proposed interoperability event, which is intended to demonstrate interoperability among ISDN products from a variety of vendors ("GM presses ISDN group for action," *NW,* Oct. 16).

Then, Norem said, the competitive process will take over and application development will flourish. "If vendors start using the forum's software interface and developing products, then the forum has served its role."

LAN Mgr. readies for offensive

continued from page 1

ager 2.0 briefing earlier this month, Mike Murray, head of Microsoft's network business unit, acknowledged the shortcomings of the initial release.

In comparisons with NetWare, Murray said, "We really got dinged in a number of areas," including DOS shell size, which was too large; fault tolerance, which was nonexistent; and security.

Worse, the initial releases, like MS-Net, used the old DOS file system. That file system is a hopelessly inadequate foundation for a high-performance file server and earned LAN Manager the "Son of MS-Net" sobriquet.

In LAN Manager 2.0, DOS shell size is reduced from 149K bytes to 93K bytes — 59K bytes on workstations with Lotus Intel Microsoft (LIM) 4.0 exanded memory specification — and a suite of fault-tolerance features have been added, including disk mirroring and disk duplexing ("Next-generation LAN Manager set to debut," *NW,* Nov. 6).

Greatly tightened security provides logon restrictions by time of day and location, encrypted logons from DOS workstations and protection against password break-in programs.

The DOS file system had already been replaced in OS/2 1.2 with a new High Performance File System (HPFS) designed from the ground up for the file server environment. HPFS was already a vast improvement, but it got a boost from LAN Manager 2.0.

The 2.0 version runs on Intel Corp. 80286-based systems and, as such, is not a 32-bit, 80386-specific network operating system like NetWare 386. However, Microsoft has separated out the HPFS portion and implemented it in 32-bit code for servers that can take advantage of it.

When LAN Manager 2.0 is installed, it automatically senses whether the processor is at least an 80386 and, if so, loads the HPFS-386 version of the file system. This separable file system can be further exploited with another feature of LAN Manager 2.0 — support of two processors.

In a server supporting dual 80386 or 80486 processors, such as Compaq Computer Corp.'s new SystemPro (see "Compaq unveils EISA-based superserver line," page 1), the HPFS and network I/O subsystem can be installed on the second processor. The basic OS/2 logic that runs server-based applications — such as electronic mail or the Ashton-Tate Corp./Microsoft SQL Server — remains on the first processor.

This two-processor configuration keeps heavy use of such server-based applications from degrading network I/O.

Actual implementation of the two-processor feature is left to LAN Manager OEMs, and Compaq did its own development. However, Parallan Computer, Inc. of Mountain View, Calif., last week said it has developed generic system software that other LAN Manager OEMs can license, which will add support for multiple processors to their products.

Microsoft is touting the multiple-processor capability as a first over NetWare 386, which does not support multiple processors in the current 3.0 version or in the 3.1 version due out early next year. Drew Major, NetWare's chief architect, conceded the point but said Novell is under less pressure to spread NetWare out across multiple processors.

"OS/2 is very CPU-intensive, while NetWare is not," he said.

The primary reason for this distinction is that NetWare was designed specifically as a file server operating system. OS/2 is a general-purpose operating system with network extensions that turn it into LAN Manager.

Microsoft contends that this approach — having OS/2 running on servers and workstations — gives LAN Manager an advantage over NetWare as LANs evolve from resource-sharing mechanisms to platforms for client/server computing, in which applications are distributed across servers and workstations.

Novell's position is that Microsoft's strategy assumes a fairly homogeneous environment, while Novell's specialized server approach is more suited to a network that connects clients and hosts running a mixture of operating systems.

Which strategy is better overall remains to be seen, but Microsoft's has led to an interesting development in LAN Manager 2.0 — Peer Services. This feature gives OS/2 workstations on a LAN Manager network some server functionality. They can function as auxiliary servers for sharing local hard disks, printers, communications queues and other such resouces.

The Peer Services feature seems to be moving OS/2 in the direction of the type of networking done in the Unix workstation environment. In that environment, there is no net operating system; networking functionality is built into the workstation operating system, and a given workstation can be configured as a client, a server or both.

The battle of the network operating systems should heat up as the decade opens. Both LAN Manager 2.0 and NetWare 386 3.1 are slated for release in the first quarter of 1990. And LAN Manager is finally a serious contender.

User automates help desk

continued from page 1

develop its Help Desk Call Management System for DOS-based microcomputers. This served as a prototype for IBM's OS/2-based Problem Management Productivity Services (PMPS), a tool for automating help desk functions that IBM announced last month ("IBM services troubleshoot SNA nets," *NW,* Oct. 9).

"IBM developed the [PMPS] platform on our requirements, said Bud Turner, director of data center services for McKesson. The company has had the prototype for more than a year.

Now McKesson is using the IBM software as the base for its effort to link central Personal System/2 consoles to net management systems that run on equipment from Digital Equipment Corp., Tandem Computers, Inc., AT&T and other vendors.

The first step

McKesson's first application developed with the IBM tools, the Help Desk Call Management System, automates data entry to other host-based and remote problem management systems.

Two McKesson employees — neither of which had any programming experience — developed the prototype in 170 hours over the course of four months, Turner said. "The prototype allowed us to take a 41% increase in call volume in the last year" without adding staff, he said.

The company is running the help desk software on seven Personal System/2 Model 70s that are linked on an IBM Token-Ring Network. The Token-Ring, which runs throughout McKesson's network control center in Rancho Cordova, Calif., is attached to one of McKesson's two IBM 3090 mainframes.

When a user calls in with a problem, the help desk operator keys in the user's location and telephone number, and a description of the problem. Most problems do not have to be escalated beyond the help desk level, but for the 15% that do, the software streamlines operations.

Problems that need to be escalated can be forwarded to McKesson's host-based IBM Information Management problem management system by hitting a single key on the Personal System/2, eliminating the need to use a second terminal to rekey the record, Turner said. The record is funneled to the host system through an administrator's workstation configured as a server.

If the problem is with IBM hardware, the server uses a separate IBM offering, the Electronic Customer Communication Option (ECCO), to dial up an IBM service center in Boulder, Colo., and transmit data about the problem. As IBM personnel address the failure, the vendor uses ECCO to forward status updates to McKesson's problem management system. That eliminates at least two phone calls that McKesson personnel would otherwise make.

Protocol android

For the last six months, McKesson has been using another IBM product to tie multivendor equipment and net management systems to the Token-Ring Personal System/2 data center network. As McKesson builds windows into these various systems, it plans to build applications using REXX to automate responses to common alarms.

The link to other network management systems is made possible using IBM's Local Area Network Asynchronous Connection Server (LANACS) software running on a Personal System/2 and supporting two Real Time Interface Coprocessors (RTIC).

Each RTIC has eight asynchronous ports that McKesson uses to support IBM and non-IBM equipment and net management systems. LANACS provides protocol conversion so those terminals can be accessed by any Personal System/2 on the Token-Ring. "It's kind of like a protocol droid" that speaks a million languages, Turner said.

> "The prototype allowed us to take a 41% increase in call volume in the last year."
>
> ▲▲▲

For example, McKesson uses a net management system based on a DEC MicroVAX to monitor its nationwide network of very small aperture terminal satellite dishes ("VSAT net gives McKesson competitive edge, savings," *NW,* Oct. 24, 1988). Using LANACS, any Personal System/2 on the data center Token-Ring can emulate a DEC VT-100 terminal and control the VSAT management system.

McKesson is also working to develop software that will ship alarm data from all its network devices to IBM's NetView network management system. Turner said the company has already learned how to convert non-SNA net management data streams to the generic alert format that NetView requires, a task usually handled by IBM's NetView/PC interface.

The software that does that conversion also runs on a Personal System/2, he said, and will be used in conjunction with the automation applications the firm is developing. For example, a program is being developed that will periodically poll the firm's T-1 multiplexers for error statistics and analyze the data to determine if any thresholds have been exceeded. If so, the application will store the record and send an alert to NetView.

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Unforeseen problems that can put the bite on your network

Tracing the problem

BY CURTIS BEMIS

Late last year, Digital Equipment Corp. unveiled various flavors of its DR-2000, a new generation of DECnet routers that are particularly useful for connecting local-area networks to wide-area nets (WAN) via 56K or 64K bit/sec digital data service (DDS) lines. Each DR-2000 has an Ethernet port and, depending upon the software, can drive four synchronous output ports using the Digital Data Communications Message Protocol (DDCMP) or Link Access Procedure B (LAP B). (The X.25 model uses both DDCMP and LAP B, while the plain vanilla DR-2000 uses DDCMP only.)

In addition, the DR-2000 comes with excellent diagnostics: the Trace Utility, which, in essence, turns the new DEC router into a specialized network analyzer for the DECnet protocol suite. Details of the data-link layer for all connections, Ethernet and synchronous ports, and the DECnet network layer may be traced and analyzed via this utility for DDCMP, for X.25 at Open Systems Interconnection Levels 1, 2 and 3, and for IEEE 802.3 Ethernet.

The Oak Ridge National Laboratory (ORNL) uses a 56K bit/sec, dedicated DDS line that runs between two DR-2000s, with a pair of 56K bit/sec channel service unit/data service units (CSU/DSU) for the DDS communications. This link connects a local DECnet network with a wide-area DECnet network. ORNL leases the DDS line from a large commercial supplier of leased lines, which shall remain nameless.

When ORNL's WAN service began almost a year ago, our 56K bit/sec line started to take "hits," about once a day on the average. We also began to accumulate errors on our outbound line — that is, our transmit pair. A hit is defined as the DECnet circuit going down — known as DECnet Event 4.8, Circuit Fault — with the reason noted as "line synchronization lost." A fraction of a second later, the circuit would come back up — known as DECnet Event 4.10, Circuit Up. It would then go down again — sometimes only for a minute, other times for as long as 10 minutes. These hits accumulated almost exclusively on our outbound line — almost never inbound — and filled up the OPERATOR.LOG of the DECnet Event logging host.

This problem persisted for almost six months. During this time, I got to know, on a first name basis, all of the data support communications engineers at our long-haul supplier, as well as all of the extensive internal routing in that supplier's network. The long-haul supplier beat up on our poor old CSU/DSU's relays by pulling it into loop-back so often, and I let them have the circuit for testing so many times that it seriously affected the *real* use of the line.

Almost all data support people use Telecommunications Techniques Corp.'s FIREBERD-6000, a bit error rate tester with many capabilities for both T-1 and DS0 (56K bit/sec) lines. Supposedly, if there was a fault, the FIREBERD would tell us. But, every time the supplier tested the line for a fault, it found the line to be clean, the implication being that the problem had to be with us.

Finally, I'd had enough; I decided to use the DR-2000's Trace Utility to attack this 6-month-old headache myself. Because the Trace Utility should not be left on all the time, especially when you put the output in a disk file, I defined a hot key on my terminal that invoked a command file to turn on the Trace Utility, passing the requisite access control information to it (it takes privileges to do it at our site), directing the output to a disk file and telling Trace to operate only on the DDCMP protocol for the particular port on the DR-2000 that had our flaky DDS line. Having done that, I would usually work with the appropriate operator privileges so my terminal was also getting the logged DECnet Events.

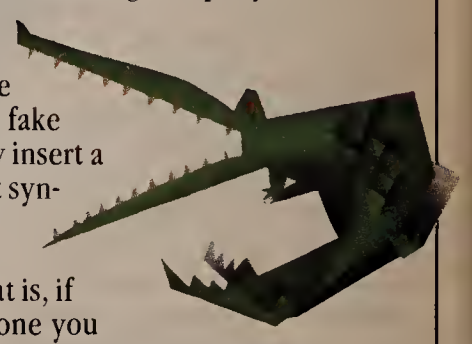
It wasn't long before our circuit again took a hit. I touched the hot key, and the Trace Utility began to run. After the hit episode was over, I examined the Trace Dump carefully. Now, one way that DECnet declares a DDCMP circuit down, with the reason "line synchronization lost," is for the DDCMP driver to receive seven consecutive negative acknowledgments (NAK) after attempting to transmit a DDCMP packet. DECnet and the DDCMP driver simply say, "There must be trouble on the line; let's start from the beginning, do a quick resync and restart, bring the circuit up and try again and again and again." This is what was happening, as I had suspected.

Examining the packets that received NAKs, I discovered something interesting: They all had more than 24 consecutive bytes (greater than 192 bits) of hexadecimal FFs. (FF equals eight bits, all of which are ones.) That is a lot of ones in a long sequence. Again, the DDCMP NAK reason for failure, from the remote end, was that the packet got NAKed for a cyclic redundancy check error in the data field of the packet that contained more than 192 bits in a row of ones. That was really strange because when the packet had left our DR-2000, it was in pristine shape — no errors until it disappeared into the wall and emerged at the other end. The problem was not ours at all, and now I had the documentary evidence to prove it.

But, while it's nice to have a hypothesis and some documentary evidence, it's even better to be able to create the event at will. I did this by issuing the DECnet NCP Command Loop Node XXXXX With Ones Length ZZ, where XXXXX was the remote DR-2000 and ZZ was the length in bytes of the DDCMP message that contained the FFs (all ones).

Only when ZZ got larger than 24 (192 bits) did the circuit crash — 24 or lower was fine, greater than 24 was not, and it took all ones to do it! I traced a few episodes of deliberate hits and contacted some of our users with remote connections on our DECnet to demonstrate my findings. However, the carrier's data support engineers told me my solution was impossible, not particularly credible and that it had never showed up in any of their "extensive testing." If you know about DS4 framing in T-1 land, you know that the 193rd bit in a T-1 packet is a frame bit, and there has to be a bit transition for the carrier's network not to lose synchronization. Clock, or synchronization, pulses have to be there or the carrier's T-1 net fails to work.

Our 56K bit/sec line went in and out of at least three T-1 trunks — T-1 multiplexers and associated network hardware — on its way to the remote end. Somewhere, our long-haul carrier was screwing up our digital data communications; in fact, because our long-haul carrier didn't have a point of presence in Oak Ridge, Tenn., it was likely that the regional Bell holding company had something to do with it, too. In addition, the supplier could not even test packets with more than 24 ones in a row because, to a FIREBERD, ones look like line synchronization pulses! What you have to do is fake the FIREBERD; that is, tell it you want it to artificially insert a bit error rate of one in 1,000 in an otherwise straight synchronous stream, which is all ones. When you do loop-backs with the FIREBERD, if you see an indicated bit error rate that differs from one in 1,000 — that is, if you get back a bit error rate that differs from the one you inserted — you know there's a problem. The engineers did this and quickly confirmed my observations. Using this new diagnostic, they soon found two bad cards in their network. The engineers inserted new cards and returned our line to us. We have not taken a hit similar to that described above since.



This story has several morals. First, don't believe everything link-level engineers at your carrier tell you. Second, use the Trace Utility. Third, test your own DDCMP DDS lines by doing a Loop Node test with varying size messages of ones. If your network is experiencing strange circuit hits, you may have the same problem I encountered.

Bemis is a senior research staff member in the Physics Division with the Oak Ridge National Laboratory in Oak Ridge, Tenn.

IT'S HARD TO DRAIN THE SWAMP when those reptiles keep getting in the way. If you have a network "alligator story" to share with *Network World* readers, call Steve Moore, features editor, at (508) 820-2543, ext. 732, or fax your idea to (508) 879-3167.

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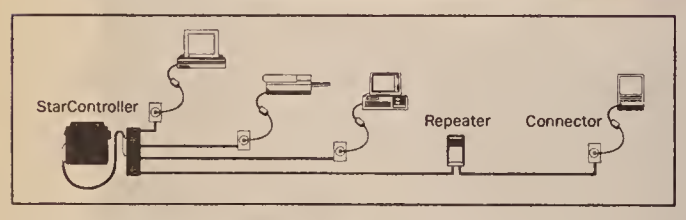

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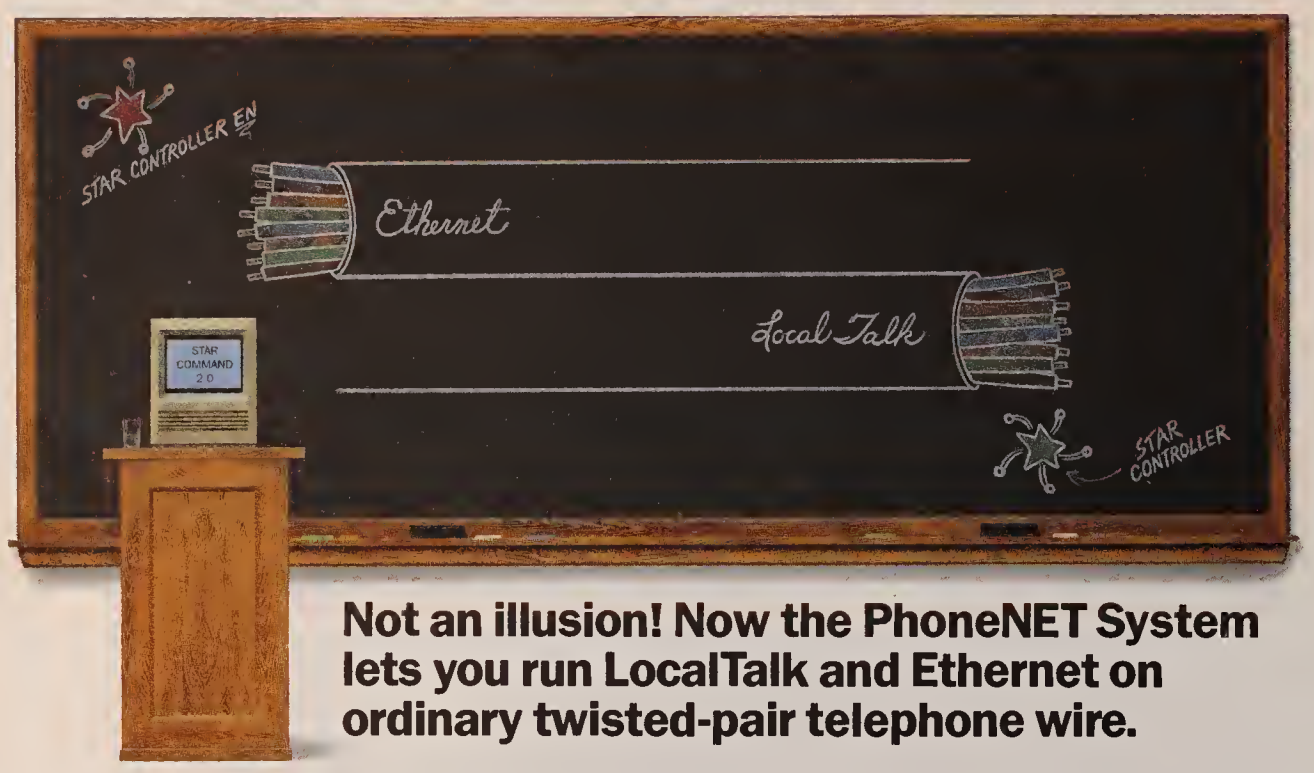
Introducing EtherNet.



Not an illusion! Now the PhoneNET System lets you run LocalTalk and Ethernet on ordinary twisted-pair telephone wire.

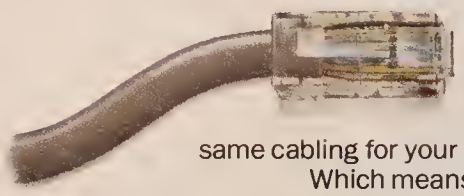
The PhoneNET System just got a lot faster. Farallon's PhoneNET StarController EN and PhoneNET StarConnector EN let you run Ethernet at 10 mbps over ordinary twisted-pair telephone wire.

What's even better, you can combine our Ethernet components with our LocalTalk PhoneNET StarControllers and StarConnectors to create hybrid networks that are reliable, cost-effective, and easy-to-manage.

Imagine, now you can run high-performance Ethernet for people who frequently access a central data base, transfer large graphics files, or operate network-intensive applications such as CAD or desktop publishing. And run low-cost LocalTalk for everyone else. All on the same wiring system.

Running two well-defined standards like Ethernet and LocalTalk also means your network is compatible with Macintoshes and IBM personal computers, NeXT and Sun workstations, laser printers and DEC VAXes. And everything will communicate using popular network software, such as AppleShare, 3Com 3+, TOPS and Novell Netware.

Your future is in the stars.



If you think hybrid networks make sense, here's an even more sensible idea: active star networks over twisted-pair telephone wire.

Stars are the standard for telephone networks, with cables running from the phone closet out to each desk. The PhoneNET System uses this same cabling for your computer network.

Which means if you already have a LocalTalk network using the PhoneNET System, then creating a hybrid LocalTalk/Ethernet network should be easy.

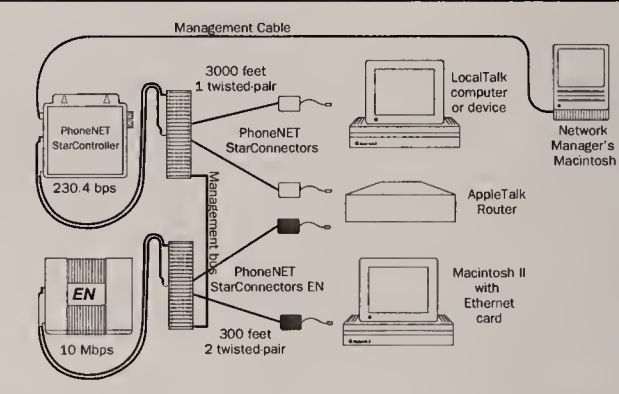
Manage to stay in control with StarCommand 2.0.

Of course, a larger, faster network requires more management power. Our StarControllers have been designed to make it easier and faster to isolate and fix problems without disrupting the network.

For example, our StarControllers automatically turn off jamming ports on LocalTalk and Ethernet, thus protecting the rest of the network, and turn them back on when the jam clears.

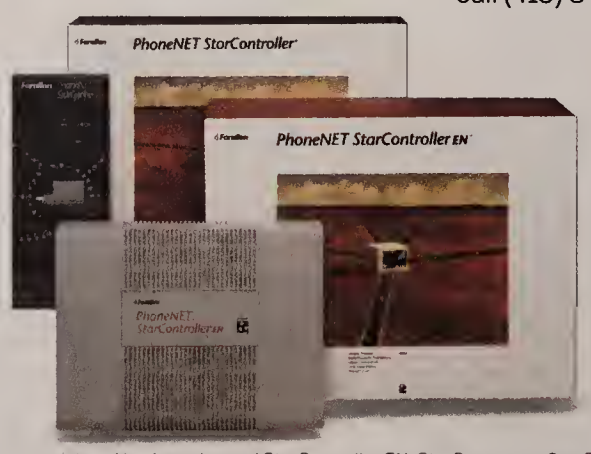
Plus, each StarController comes with StarCommand 2.0 software, which continuously monitors the network and alerts the network manager to any problems. Running under MultiFinder and password-protected, StarCommand will isolate and diagnose problems without interfering with the rest of the network. And since it works over a dedicated management bus, you can troubleshoot even if the network is down.

StarController EN:
- Standards: IEEE/CCITT 802.3 Ethernet
- Supports 12 branches of 328 feet each
- AUI interface for connection to coax based Ethernet LANS
- Diagnostic LEDs for power, ROM, RAM, and to indicate packet transmission to each port
- Interconnect multiple StarControllers EN to support up to 1,024 users



You say Ethernet, we say Eithernet.

Look at it this way. Even if you're doing more things on AppleTalk than ever before, chances are, only some of your people are facing critical mass. Everyone else is perfectly happy and productive. So rather than installing Ethernet everywhere, maybe you should consider running both LocalTalk and Ethernet. At the same time. Over the same network cabling. With the PhoneNET System. For more information or technical support, call (415) 849-2331.



PhoneNET System™

Look for the PhoneNET System logo when you buy network hardware and software products. It is your best assurance of quality and reliability.

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Call For Innovation

To: Professionals in ICA member companies

Get the recognition you deserve for your innovative communications applications.

Through the Call for Innovation, the **International Communications Association (ICA)** and ***Network World*** honor telecommunications and data communications professionals of ICA member companies. How end users creatively apply communications technology to solve problems and create new business opportunities is what the ICA/*Network World* Call for Innovation is all about.

The Call for Innovation is your forum for sharing with peers innovative solutions you've developed and the results of original applications research in communications. Professionals in ICA member companies whose accomplishments are recognized will have the opportunity to present their projects to the ICA membership at a featured session during the ICA 1990 conference May 20 to 25 in New Orleans. The ICA will publish a journal of all qualified Call for Innovation papers. Presentations will also be considered for publication in ICA's award-winning *Communique,* a publication that reaches communications managers, directors and vice-presidents in nine countries.

If you're not sure whether your company is an ICA member, check the alphabetical list on the inside back cover of this form or call ICA at 1-800-ICA-INFO. If your company is not a member and can meet ICA's eligibility requirements, you can join ICA and gain the opportunity to share your innovative solutions with your peers in May.

How does it work?

You may submit a 150- to 250-word abstract describing your work in one of three categories:

1. Original research conducted in your organization that resulted in new applications for technology.

2. Applications that encouraged vendor(s) to develop new products or services for your needs.

3. Results of legal actions taken by your company that had a positive impact on standards or regulatory issues.

Please write or type your abstract in the space provided below and return this postage-paid form to *Network World* before February 1. Please be sure to fill out your name, address and telephone number. If you qualify, you will be contacted by a representative of ICA or *Network World* for further information.

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